American
Journal of Orthodontics
and Oral Surgery

(All rights reserved)

VOL. 24 JULY, 1938 No. 7

Orthodontics

PRESIDENT'S ADDRESS

SOUTHWESTERN SOCIETY OF ORTHODONTISTS

A. B. CONLY, D.D.S., DALLAS, TEXAS

IT SEEMS fitting that we should welcome you to Dallas for this eighteenth annual meeting of the Southwestern Society of Orthodontists; for this is *home*. Just eighteen years ago the Society was organized in this hotel. At the suggestion of Dr. Duckworth and Dr. Gorman a meeting was held to organize a study club for the advancement of orthodontics in the Southwest. Seven men attended the meeting. Dr. T. O. Gorman was the first president and Dr. P. G. Spencer secretary-treasurer. The other five men were W. T. Chapman, O. E. Busby, T. G. Duckworth, C. M. McCauley, and A. B. Conly. At the first regular meeting in 1921, Dr. A. H. Ketcham was the instructor. From this small beginning we have grown into one of the best sectional societies in the country. We have every reason to be proud of our membership in this organization.

One of the most progressive steps taken by organized orthodontics in recent years is the approval of the reorganization plan submitted at the Chicago meeting of the American Society of Orthodontists. In the past, as you know, all the sectional societies have worked independently, with conflicting constitutions governing them. Under this new plan there are many advantages. Each component society will work under the same general constitution and by-laws as the American Association. There will be definite boundaries for each section. The members of the sectional societies will make up the membership of the American Association of Orthodontists. To become a member of the American Association it will be necessary first to become a member of the sectional society. Under the new plan every member of the American Association of

Read before eighteenth annual session of the Southwestern Society of Orthodontists, Adolphus Hotel, Dallas, Texas, March 6-9, 1938.

Orthodontists will receive the JOURNAL without additional cost. I am sure it would be very gratifying to the men from our own Society who have worked so diligently on this plan to see every one in our group a member of the American Association of Orthodontists.

There is one suggestion I should like to make at this time. When we refer a case under treatment to another orthodontist for continued treatment, we should give him all the information necessary to carry on the work successfully. Particularly should we tell him the kind of materials used in making the appliances. As you know, there have been many new materials put on the market in the last few years; although they look very much alike, they require entirely different technique in handling. This added information would be invaluable to the man who has the responsibility of continuing the treatment already begun, for very few orthodontists use identical materials throughout the construction of an appliance.

Since the beginning of the so-called depression and the advent of cheaper materials, I feel that we have lost sight of the fact that *primarily* we sell *service*. In the treatment of a case the materials used should have *no* bearing on the fee charged. A man should use the materials with which he can obtain the best results, regardless of cost. On the other hand, I see no reason for lowering the standards of our profession in the eyes of the public because we have a good cheaper material available. It does not seem to me wise to discuss with patients the kind of materials used in treating a case, for the average person cannot possibly know what is required of an orthodontic appliance. After all, our patients should be interested in the service rendered and the results obtained.

Dr. T. W. Sorrels deserves much credit for his splendid work in having laboratory advertisements eliminated from our journals. We all know and appreciate the time and effort it has taken to accomplish this result, and he is to be commended for this fine piece of work.

Next year, in 1939, the Southwestern Dental Congress will meet in Oklahoma City. A wonderful meeting is being planned, and a cordial invitation has been extended to all of us. Let us make our plans to attend this meeting and do our part to insure its success.

I want to take this opportunity to thank all those who have worked so faithfully during my administration. The local arrangements committee, Dr. Busby, Dr. Williams with Dr. Bell as chairman, has spared no effort to make this meeting a success. The Dallas County Dental Society has cooperated in every possible way. The Board of Censors, with Dr. Weaver as chairman, has planned a very interesting and instructive program, and Dr. Turner has arranged for many splendid clinics. As all the golfers know, Dr. Woodring did a fine job of handling the golf tournament. Dr. Harrison, our president elect, has worked with all committees in an advisory capacity. Last but not least, I want to thank our most efficient secretary, Dr. Harry Sorrels, for his untiring efforts. He has given much valuable advice to me during the year.

I sincerely hope that this meeting will prove to be both enjoyable and profitable to each one of you.

MEDICAL ARTS BLDG.

INCIDENCE AND EFFECT OF PREMATURE LOSS OF DECIDUOUS TEETH*

ALEXANDER L. UNGAR, D.D.S., NEW YORK, N. Y.

THAT premature loss of deciduous teeth has always played an important part in discussions on the causes of malocclusion is evidenced by a perusal of recent literature on orthodontics and preventive dentistry (Conover, Curley and Sippy). Baker, Chapman and Humphrey claim that of all the possible etiologic factors this is by far the most prevalent.

In all the literature on this subject, however, no one to my knowledge has made precise observations on what actually takes place. Conclusions have been based on visual observations and usually on a few isolated cases. The present study considers the incidence of premature loss in a large series of cases, and in addition describes statistically, which means precisely, (1) whether the spaces resulting from premature loss of deciduous teeth close, open or remain unaffected, and (2) the effect of premature loss on the subsequent eruption of the permanent teeth.

Since it is universally agreed that premature loss is one of the etiologic factors in malocclusion, the need of such a study is unquestionable. Only when we thoroughly understand what takes place in the jaws after the premature loss of these teeth can a more intelligent procedure of prevention be carried out.

MATERIAL

The material for this study was taken entirely from the voluminous files collected by the Child Research Division of the Department of Preventive Dentistry, New York University College of Dentistry. For complete details of all these records the reader is referred to the articles by Goldstein and Stanton.

The data presented in this study are based on findings in 1,183 sets of dentures, representing 292 children ranging in age from three to fourteen inclusive. Each child was examined at yearly intervals, and in each case at least two sets of dentures were taken—in the majority four or five sets. (In all, 366 children were under study in this Department at one time or another, but in 74 cases only one set of dentures was taken; and as no comparison could be made from one year to the next, these 74 cases were discarded for the purpose of this study.)

There was no deliberate selection of subjects, the children being mainly from middle-class families whose diet and health were similar to those of average children of a similar social sphere with approximately the same ad-

*This study was conducted in the Child Research Division, Department of Preventive Dentistry, New York University, College of Dentistry.
Presented before the New York Society of Orthodontists, New York, N. Y., Nov. 16, 1937.

vantages and disadvantages. The types of occlusion consisted of normal and abnormal in about the same proportion as is usually found in children of this class.

The sets of dentures were obtained by taking plaster of Paris impressions of the maxillary and mandibular jaws. The casts from these impressions were made by a specialist in this work in the laboratory of the College of Dentistry, New York University. These casts were then set up in a Stanton pantograph, and accurate orthographical maps, enlarged 5 diameters, were projected. The accuracy and reliability of these maps have been verified by Ashley-Montagu. All measurements were taken from these orthographical maps, which by reason of the enlargement reduced the percentage of human error.

METHOD OF STUDY

The master file was examined for all those cases in which at least two sets of models were recorded. These cases were then tabulated. From these tables I was able to classify the cases as regards sex, age, and type of occlusion.

With the aid of the information thus gathered, I next examined the individual file of each patient who was eligible for this study, and analyzed the casts, x-ray pictures and orthographical maps pertaining to it. From these I selected the cases in which deciduous teeth had been lost. A record of these cases was made, and they were checked against the master files for age. In each case in which loss of deciduous teeth was found to be premature a form was drawn up, and all results were recorded on this form. These cases were then rechecked with the x-ray pictures to avoid any possibility of error.

The actual measurements were taken from the orthographical maps. For this purpose the centers of the teeth adjoining the space caused by the premature loss were used as landmarks. The space between these centers was accurately measured to a tenth of a millimeter, the differences between these measurements from year to year being considered as the loss or gain of space for that case.

At first the cases were subdivided into those occurring in males and females, on left and right sides, in maxilla and mandible, and according to whether the occlusion was normal or abnormal, with classification or type. At the conclusion of the measurements it was found that sex did not affect the results, and hence this factor was discarded from further study.

Table I presents the data in 292 cases of occlusion of the deciduous teeth as related to premature loss. A study of this table shows that in 62 cases of a possible 292 there was premature loss of teeth, a percentage of 21.2. This figure corresponds closely to the results of Brandhurst, who found that in the cases he examined 20 per cent had premature loss of deciduous teeth. Unquestionably such a high percentage offers a real challenge to dentistry to overcome this loss, and a real problem to solve once loss has occurred.

It is of particular interest to note from Table I the relationship between the number of cases with premature loss and the total number of cases in the study, especially in regard to type of occlusion. Of 138 cases with normal

occlusion only 18 showed premature loss, a percentage of 13; while of 154 cases of abnormal occlusion premature loss occurred in 44, a percentage of 28.5. The difference between these is 15.5 per cent; in short, the incidence of premature loss was more than twice as great in those patients whose teeth were malocclueded.

TABLE I

NUMBER AND PERCENTAGE OF SUBJECTS WITH PREMATURE LOSS OF DECIDUOUS TEETH ACCORDING TO TYPE OF OCCLUSION (BOTH SEXES)

TYPE OF OCCLUSION	ABNORMAL GOOD*	EXCESSIVE OVERBITE	OPEN-BITE	CROSS-BITE	CLASS II	TOTAL ABNORMAL	NORMAL	TOTAL
Total number of subjects	20	71	9	16	38	154	138	292
Number with prematurely lost teeth	13	22	2	1	6	44	18	62
Percentage of subjects	65.0	31.0	22.2	6.3	15.8	28.5	13.0	21.2

*Abnormal good signifies any form of malocclusion (usually Class I) without disturbance to horizontal and vertical overbite of the anterior teeth.

A further analysis of Table I shows that in all types of malocclusion there is a higher percentage of premature loss than in normal occlusion, with the single exception of cross-bite, which can be ruled out in this particular study because of an insufficient number of cases. The abnormal good type of malocclusion shows the highest percentage of premature loss, with 65 per cent. This is followed in order by excessive overbite, 31 per cent; open-bite, 22.2 per cent; Class II malocclusion, 13 per cent; and cross-bite, 6.3 per cent.

From this it is very evident that whenever we find a malocclusion, the possibility of premature loss is much greater than if the child has a normal occlusion. Hence those patients with malocclusion should be examined at shorter intervals than those with normal occlusions, and the slightest dental defects should be immediately corrected.

TABLE II

DISTRIBUTION OF PREMATURELY LOST TEETH IN MAXILLA AND MANDIBLE ON RIGHT AND LEFT SIDE OF JAWS

TOOTH	MAXILLA			MANDIBLE			TOTAL		GRAND TOTAL
	RIGHT	LEFT	TOTAL	RIGHT	LEFT	TOTAL	RIGHT	LEFT	
C*	1	1	2	2	1	3	3	2	5
D*	10	7	17	16	14	30	26	21	47
E*	10	12	22	13	11	24	23	23	46
Total	21	20	41	31	26	57	52	46	98

*Letters refer to deciduous teeth: C, cuspid; D, first molar; E, second molar.

From Table II it may be seen that more teeth had been lost on the right side than on the left. While it is true that the difference, when reduced to percentage values, is not very great, still it is sufficient to warrant further study. The right side had lost 52 of the 98 teeth prematurely lost, a percentage of 53, or 6 per cent greater than the left side of the jaws. Tooth C was prematurely lost 3 times on the right side and twice on the left; tooth D 26 times on the right and 21 on the left; while tooth E was prematurely lost on both right and left sides equally, 23 times.

Table III

Teeth Lost, Extent of Movement of Adjacent Teeth, and Age of Subjects in Cases With Premature Loss of Teeth

Movement	None 0.0 ± 0.2 mm.				Slight −0.3 to −0.7 mm.				Moderate −0.8 to −2.0 mm.				Marked −2.1 to −3.5 mm.				Slight +0.3 to +0.7 mm.				Moderate +0.8 to +2.0 mm.				Marked +2.1 to +3.5 mm.			
Tooth*	C	D	E	D+E	C	D	E	D+E	C	D	E	D+E	C	D	E	D+E	C	D	E	D+E	C	D	E	D+E	C	D	E	D+E
Age																												
												Maxillary Arch																
4- 5										2				1														
5- 6						1				4	1																	
6- 7		3				1	1			1	1	1			1													
7- 8		2		1		1	1	1		2	2			1	7	1												
8- 9	2	1	1	1		1	3	1		3	5	1		1		1												
9-10	1	1			1	2	2	2		1	2	1							2									
10-11	1	1	2	1			2	2									1	1										
11-12							1	2			1																	
12-13																								2				
13-14																								1				1
												Mandibular Arch																
3- 4										1																		
4- 5										1																		
5- 6		1				1				4	1																	
6- 7			1			3		1		4	3	1	1						1									
7- 8			4			2	1	1		4	1	1		1			1											
8- 9	1	3	1		1	4	1	4		5	2				1					1					1			1
9-10	1	4		3	1	2				2	1	1								1		3		1				
10-11		5		4		1		1											1	1		1						
11-12		2		1				1															1					
12-13			1																									
												Total Number of Cases With Premature Loss																
Maxilla (4-14) No.	4	8	3	3	1	6	10	8	—	13	12	3	—	3	8	2	1	1	2	—	—	—	—	3	—	—	—	1
Per cent	4.3	8.7	3.2	3.2	1.0	6.5	10.8	8.7	—	14.1	13.0	3.2	—	3.2	8.7	2.1	1.0	1.0	2.1	—	—	—	—	3.2	—	—	—	1.0
Mandible (3-13) No.	2	15	7	8	2	13	2	8	—	21	8	3	1	1	1	—	1	—	2	3	—	4	1	1	1	—	—	1
Per cent	1.9	14.3	6.6	7.6	1.9	12.4	1.9	7.6	—	20.0	7.6	2.9	0.9	0.9	0.9	—	0.9	—	1.9	2.9	—	3.8	0.9	0.9	0.9	—	—	0.9

*Letters refer to deciduous teeth: C, cuspid; D, first molar; E, second molar.

While further observations in larger series of cases may show a closer correspondence between the two sides, for the present we may safely assume from the results obtained in this study that the right side is affected by premature loss slightly more frequently than is the left.

As regards the distribution between the two jaws there seems to be definite evidence that the mandible loses more teeth prematurely than does the maxilla. This holds true not only for the total number of teeth lost but also for each one of the three involved in this study. Here we find that 57 of the 98 teeth prematurely lost appear in the mandibular arch, a percentage of 58.2, or 16.4 per cent greater than the loss in the maxillary arch. This is an appreciable difference, far more definite than that between right and left sides. In the mandible tooth C has been prematurely lost 3 times, in the maxilla only twice; tooth D has been lost 30 times in the mandible as compared to 17 times in the maxilla; and tooth E has been lost 24 times against 22 in the maxilla.

A careful analysis of Table III shows that regardless of the tooth or teeth involved the reaction is the same in the large majority of the cases. That is, of 92 cases of prematurely lost teeth in the maxilla only 8, or 8.7 per cent, showed a gain in the space caused by this premature loss. In the mandible the findings were essentially the same, though the percentage was a little higher. Of 106 cases, 14 showed increase in space, a percentage of 13. For both complete dental arches we have a percentage of 11.1. This is such a small percentage that it is safe to say that with premature loss the tendency is against increase in space.

In those cases in which we have comparatively no change in space it may be noted again that the percentage is higher in the mandible than in the maxilla. In the maxilla the space remained the same in 18 cases, a percentage of 19.6, while in the mandible the amount of space was unchanged in 32, a percentage of 30.2. The total number of cases in which the space remained the same is 50, or 25.2 per cent.

When we consider the larger group of cases in which the spaces tended to close, however, we find that the maxilla shows the higher percentage. This is especially true in those cases where the changes were marked. There are 13 cases of marked change in the maxillary arch, a percentage of 14.1; while only 3 occurred in the mandible, a percentage of 2.8. A factor of particular interest is that most of the moderate and all the marked drifts in both the maxilla and the mandible occurred from the sixth to the ninth years. Hence it is within this age period that the greatest care must be exercised if we are to avoid subsequent abnormal eruptions of the permanent teeth.

It is also to be noted that the loss of deciduous canines does not cause drift to any appreciable extent, for in all these cases the space remained approximately the same. With the loss of the first deciduous molar we see a definite trend to shifting, and with the loss of the second deciduous molar we find the greatest amount of drift.

Hence it is safe to say that there is far less drift of the teeth in the mandible than in the maxilla. Thus with premature loss our problem is far

TABLE IV

AMOUNT OF MOVEMENT OF TEETH ADJACENT TO PREMATURELY LOST TEETH AT VARIOUS AGES AS COMPARED TO TOTAL NUMBER OF DENTURES STUDIED

AGE	TOTAL DENTURES STUDIED		NONE 0.0 TO 0.2 MM.		SLIGHT -0.3 TO -0.7 MM.		MODERATE -0.8 TO -2.0 MM.		MARKED -2.1 TO -3.5 MM.		SLIGHT 0.3 TO 0.7 MM.		MODERATE 0.8 TO 2.0 MM.		MARKED 2.1 TO 3.5 MM.	
			MAX.	MAND.	MAX.	MAND.	MAX.	MAND.	MAX.	MAND.	MAX.	MAND.	MAX.	MAND.	MAX.	MAND.
3- 4	124	No.						1								
		Per cent						0.8								
4- 5	177	No.					2	1	1							
		Per cent					1.13	0.56	0.56							
5- 6	182	No.		1	1	1	5	5								
		Per cent		0.55	0.55	0.55	2.75	2.75								
6- 7	175	No.	3	1	2	4	3	8	1	1		1				
		Per cent	1.71	0.57	1.14	2.29	1.71	4.57	0.57	0.57		0.57				
7- 8	159	No.	3	4	3	4	4	6	9	1		1				
		Per cent	1.88	2.51	1.88	2.51	2.51	3.77	5.66	0.63		0.63				
8- 9	126	No.	5	5	5	10	9	7	2	1		1				2
		Per cent	3.97	3.97	3.97	7.94	7.14	5.55	1.59	0.80		0.80				1.59
9-10	98	No.	2	8	7	3	4	4			2	1		4		
		Per cent	2.04	8.16	7.14	3.06	4.08	4.08			2.04	1.02		4.08		
10-11	67	No.	5	9	4	2					2	2		1		
		Per cent	7.45	13.43	5.97	2.98					2.98	2.98		1.49		
11-12	38	No.		3	3	1	1							1		
		Per cent		7.89	7.89	2.63	2.63							2.63		
12-13	26	No.		1									2			
		Per cent		3.85									7.69			
13-14	11	No.											1		1	
		Per cent											9.09		9.09	

more serious in the maxilla than in the mandible, for whenever drift occurs to any great extent we have a decided closing of the space formerly occupied by the removed deciduous tooth, with the result that its subsequent permanent tooth becomes impacted or very badly crowded out of position upon eruption. Also, as we go back in the dental arch we find the drift much greater than in the anterior part, with the result that our problem becomes more difficult and acute.

In Table III it was shown that in the large majority of cases in this study the spaces caused by premature loss of deciduous teeth tended to close; and that the drift was greater in the maxilla than in the mandible. A careful analysis of Table IV shows that this same trend holds true in approximately the same relative proportions for the total number of dentures examined as for those with premature loss.

Of the 16 cases with marked decrease of space 13, or 81.2 per cent, appear in the maxilla. Although in the cases of moderate decrease of space we find 28 in the maxilla as against 32 in the mandible, when we consider that more teeth were lost prematurely in the mandible the ratio is again in favor of a greater tendency to drift in the maxillary arch.

Thus Table IV shows that the entire trend observed in Table III holds true when related to all the 292 cases under study, regardless of premature loss of teeth or type of occlusion, and the same proportionate relationships may be expected to obtain irrespective of the number of cases in which there is premature loss.

TABLE V

NORMAL AND ABNORMAL ERUPTION OF SUBSEQUENT PERMANENT TEETH IN CASES WITH PREMATURELY LOST DECIDUOUS TEETH

TOOTH LOST	MAXILLA				MANDIBLE				BOTH JAWS			
	NORMAL ERUPTION		ABNORMAL ERUPTION		NORMAL ERUPTION		ABNORMAL ERUPTION		NORMAL ERUPTION		ABNORMAL ERUPTION	
	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT
C*	2	100.0	0		3	100.0	0		5	100.0	0	
D*	5	55.6	4	44.4	12	66.7	6	33.3	17	63.0	10	37.0
E*	4	25.0	12	75.0	5	45.5	6	54.5	9	33.3	18	66.7
D + E*	2	33.3	4	66.7	6	60.0	4	40.0	8	50.0	8	50.0
Cases in which space retainers were inserted soon after premature loss	5	100.0	0		7	100.0	0		12	100.0	0	

*Letters indicate tooth lost: C, cuspid; D, first molar; E, second molar.

As would be expected, the results shown in Table V follow the trend observed in Table III. It is to be recalled that in the maxilla we found a higher percentage of drift, and this has resulted in a greater proportion of abnormal eruptions in this jaw. It is of special interest that in the cases where the deciduous cuspids were lost, and those where space retainers were inserted, we had all normal eruptions of the permanent teeth. Hence one may say that the premature loss of the deciduous cuspid has no effect on the normal eruption of its subsequent permanent cuspid. Also, following the premature loss of the first and second deciduous molars, the judicious use of proper space retainers will obviate abnormal eruptions.

Of those cases (5 in the maxilla and 7 in the mandible) in which space retainers were used, all that have erupted to date have erupted normally. The permanent cuspids, 2 in the maxilla and 3 in the mandible, erupted normally. However, in the cases of premature loss of the deciduous first molars in which no retainers were used, we find that 5 maxillary first premolars have erupted normally and 4 abnormally, or 44.4 per cent erupting abnormally. In the mandible for this same tooth we find 12 erupted normally and 6 abnormally, or 33.3 per cent erupting abnormally. For the maxillary second premolar we find 4 erupted normally and 12 abnormally, or 75 per cent abnormally; while in the mandible the ratio is 5 normal to 6 abnormal, or 54.5 per cent erupting abnormally. Where both the adjoining teeth D and E had been lost in the maxilla we find that 2 have erupted normally and 4 abnormally, or 66.6 per cent erupting abnormally; while the ratio in the mandible is 6 normal to 4 abnormal, or 40 per cent erupting abnormally.

Another point of particular interest is that when the maxillary and mandibular jaws are considered together, tooth E shows a much higher percentage of abnormal eruptions than tooth D. In the case of each of these teeth, 27 permanent teeth have erupted. With tooth D, however, 17 of these erupted normally, or 63 per cent; while with E only 9 erupted normally, or 33.3 per cent.

Some may note that although previous tables show that 98 teeth had been prematurely lost, only 87 permanent teeth are accounted for. The reason for this apparent discrepancy is that in the remainder of the cases the permanent teeth have not erupted to date. However, as the trend is quite definite, there can be no doubt that this is a reliable index, and that the same proportion will hold true for the entire study when the remaining permanent teeth do erupt.

An analysis was made to discover whether malocclusions of the deciduous set resulted in a higher percentage of abnormal eruptions of the permanent teeth, and, if so, whether any particular type of malocclusion was more likely to be followed by abnormal eruptions. After a careful study it was found that the type of occlusion played no part.

CONCLUSIONS

1. There is no difference between males and females as regards premature loss.

2. Abnormal occlusion cases definitely show a higher percentage of premature loss than do cases of normal occlusion.

3. With premature loss the spaces close in a large percentage of cases.

4. Premature loss occurs more frequently in the mandible than in the maxilla.

5. Teeth in the mandible drift far less than those in the maxilla.

6. More teeth are lost prematurely on the right side than on the left, but the difference is not marked.

7. With premature loss the type of occlusion plays no part whatsoever as to whether the permanent teeth will erupt normally.

8. In all cases in which space retainers were used the permanent teeth erupted normally.

9. In all cases of premature loss of deciduous canines there was normal eruption of the permanent canines.

10. The loss of the second deciduous molar causes the highest percentage of impactions and crowdings of its permanent tooth, and the first deciduous molar comes next in this regard.

11. There are more abnormal eruptions in the maxilla than in the mandible.

I wish to thank Dr. F. L. Stanton for his general supervision and stimulating criticism; as chief of the Division of Child Research, New York University College of Dentistry, he suggested my investigation of this important topic and made available to me all the voluminous statistics that this Department has collected with their related orthographical maps, models, and x-ray pictures. I wish also to acknowledge the invaluable assistance of Dr. M. S. Goldstein, associate chief of this Department, whose aid in the various technical matters involved in an original study of this kind has been indispensable.

REFERENCES

Ashley-Montagu, M. F., Fish, G. D., and Stanton, F. L.: Description of Three Instruments for Use in Orthodontic and Cephalometric Investigations, With Some Remarks on Map Construction, J. Dent. Research **2**: 885, 1931.

Ashley-Montagu, M. F.: The Form and Dimension of the Palate in the Newborn, INTERNAT. J. ORTHO. **20**: 694, 810, 1934.

Baker, C. R.: A Consideration of the Exchange of Deciduous Teeth for Permanent Teeth, J. A. D. A. **7**: Sept., 1920.

Brandhurst, O. W.: Promoting Normal Development by Maintaining the Function of Deciduous Teeth, J. A. D. A. **19**: 1196, 1932.

Chapman, H.: Orthodontics: The Necessity of Histories to Establish Etiology; the Necessity of Extra Function in Retention; the Necessity of Preserving Spaces Closed by Premature Loss of Deciduous Teeth, INTERNAT. J. ORTHO. **13**: 768, 1927.

Conover, C. S.: Deciduous Teeth—Effect of Too Early Loss and Too Long Retention, INTERNAT. J. ORTHO. **14**: 576, 1928.

Curley, J. E.: The Deciduous Molars—Nature's Space Retainers, J. A. D. A. **18**: 1650, 1931.

Goldstein, M. S., and Stanton, F. L.: A Quantitative Study of Dental Occlusion Between Two and Ten Years, Human Biol. **78**: 130, 1936.

Goldstein, M. S., and Stanton, F. L.: Antero-posterior Movements of the Teeth Between Two and Ten Years, Human Biol. **78**: 161, 1936.

Goldstein, M. S., and Stanton, F. L.: Changes in Dimensions and Form of the Dental Arches With Age, INTERNAT. J. ORTHO. **21**: 357, 1935.

Goldstein, M. S., and Stanton, F. L.: The Various Types of Occlusion and Amounts of Overbite in Normal and Abnormal Occlusion Between Two and Twelve Years, INTERNAT. J. ORTHO. **22**: 549, 1936.

Humphrey, W. R.: Dentists' Responsibility in the Prevention of Malocclusion, J. A. D. A. **18**: 1607, 1931.

Sippy, B. O.: Early Loss of Teeth—A Study of Effects, J. A. D. A. **15**: 2228, 1928.

211 CENTRAL PARK WEST

DISCUSSION

Dr. Frederick L. Stanton, New York.—At meetings on children's dentistry and orthodontics there have been wide discussions as to whether one should use space maintainers or not, and two schools of thought have developed, one maintaining that in every case of a lost deciduous tooth a space maintainer must be inserted, and the other holding that a space maintainer must never be used.

In order to substantiate these points of view, models of individual cases only have been shown. Hellman, for instance, has shown a model in which the entire space for the mandibular second premolar has been lost, yet at a later date, and without treatment, the second premolar accomplished a normal eruption.

Therefore it is fortunate, I think, that this Society has had the preceding evidence placed before it, i.e., a series of cases with various deciduous teeth prematurely lost and the end result of these same cases in which no space retainers were used.

A few illustrations apropos may be of interest. Fig. 1 shows a case with lingual occlusion in the right maxillary cuspid region and failure of the maxillary and mandibular midlines to coincide, further complicated by the premature loss of all the mandibular deciduous molars. A year later we see an improvement in the cuspid regions as well as in the interrelationship of the midlines. In the final model, two years after the first, we note a normal relationship in the cuspid region and the midlines coinciding, as well as a normal eruption of the mandibular premolars, all without treatment or the use of space maintainers!

Fig. 1.—Model on left, age 8 years and 3 months. Model in middle, age 9 years and 3 months. Model on right, age 10 years and 3 months. Model of age 12 years and 3 months not shown. All of mandibular premolars in normal eruption.

Fig. 2.—Two upper prints (right and left) of identical twins. Middle row, two prints showing drift of first molar in identical twins. Lower row, space for second premolar almost closed.

When we study, by the mapping process, the movements of the various teeth in this case, from the first to the final model, we find that the maxillary cuspid has moved outwardly on the right side, while the reverse, or a lingual movement, has taken place in the mandibular cuspid region, thus correcting the malocclusion in this area. In the incisor area the maxillary teeth have all moved to the right, the mandibular teeth to the left, thereby correcting the original midline disharmony. The left mandibular cuspid has also moved distally.

Fig. 3.—Upper model of one of the identical twins shown in Fig. 2. Same date as upper row of x-ray pictures. Lower model showing drift forward of first molar shortly after loss of deciduous second molar.

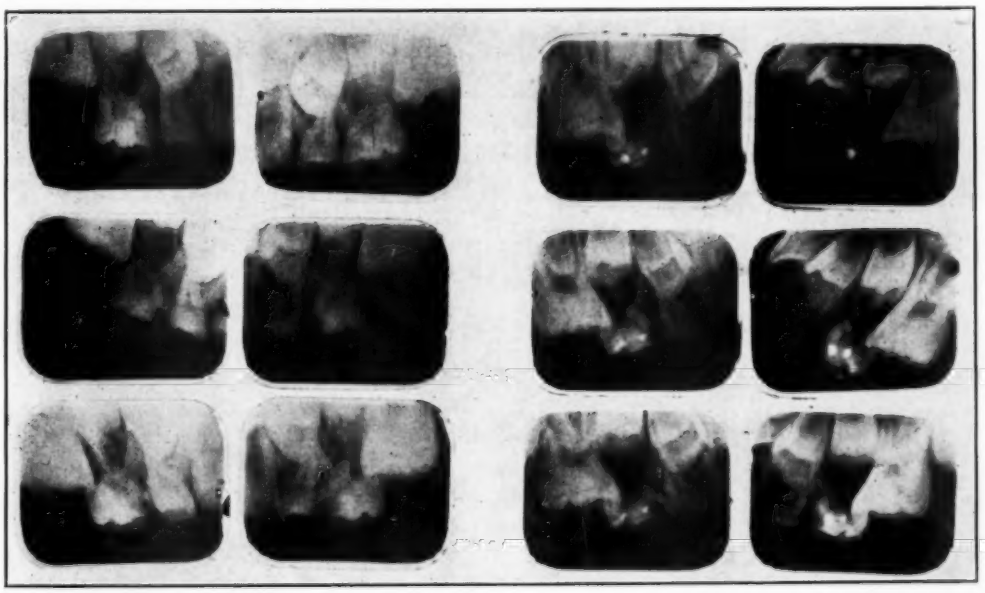


Fig. 4.—Evolution of eotopic eruption of first molar. Upper two pictures on left show a period of normality (right and left). No absorption of deciduous second molar. Middle row left, start of absorption. Lower row left, still further absorption. Reading from top row on right downwardly, the increasing absorption is shown until, in the lower row right, the deciduous second molars are about to be lost.

It is obvious that if space maintainers had been placed in the mandibular molar regions in the first place, none of these beneficial and corrective movements could have taken place.

Dr. Lewis has described a condition which he calls ectopic eruption; i.e., the germs of the permanent teeth becoming displaced before eruption. Fig. 2 shows the dentitions of

Fig. 5.—Upper row (right and left), large permanent central incisor causing absorption of deciduous central and lateral incisors. Middle row (right and left), deciduous lateral incisor prematurely lost due to large permanent central incisor. Lower row (left), permanent lateral causing absorption of deciduous cuspid near apex. Lower row (right), end of deciduous cuspid root left in jaw with crown about to be lost.

Fig. 6.—Left, mandibular lateral incisor touching root of deciduous cuspid. Right, the mandibular lateral incisor has caused the absorption of mesial two-thirds of the deciduous cuspid. The crown will probably be prematurely lost.

identical twins; prior to eruption of the maxillary permanent molars, there has been a shifting forward and absorption of the roots of the second deciduous molars. All four of these teeth were lost on the same day, allowing the four permanent molars to drift forward so that the space was nearly obliterated.

Fig. 3 shows a similar condition. Fortunately, in this case we have a series of x-ray pictures (Fig. 4) over a period of years, and can show the complete evolution of the phenomenon. In the first picture of the series (Fig. 4), there appears to be a normal condition; i.e., no absorption of the roots of the second molars; a little later absorption has begun, and each new picture following shows a gradual increase of absorption until at last the second deciduous molars have been lost. This, I believe, is the first complete picture of the evolution of this type of deformity.

Fig. 5 shows a permanent central incisor so wide that it is causing the absorption of the deciduous lateral incisor as well as central incisor, thereby causing the premature loss of the lateral incisor.

Here is another case (Fig. 5) in which the permanent mandibular lateral incisor is touching the root of the deciduous cuspid. The next picture shows that the root of the cuspid has been cut off, leaving the root end in the gum with the premature loss of the crown.

In the next case (Fig. 6) the permanent lateral incisor is again touching the root of the deciduous cuspid, causing a shearing off of the mesial aspect of the root.

Dr. Ungar is to be congratulated for bringing additional information before us on this subject, although much more evidence along similar lines is still needed before we can decide what conditions of prematurely lost teeth require space maintainers, and which do not.

If we evaluate the two schools of thought mentioned above, according to the evidence presented we would have to say that on the whole Hellman's position is far more tenable. I believe, however, that eventually we shall find that the truth lies somewhere between the two extremes of thought; namely, the space maintainers in certain circumstances are advisable, and under other circumstances, perhaps more frequently, they are inadvisable.

A NEW APPROACH TO THE UNERUPTED TOOTH BY SURGERY AND ORTHODONTICS

M. S. Strock,* D.M.D., Boston, Mass.

THE technique for uncovering teeth to assist in their eruption has evolved slowly. This paper describes a procedure successfully employed for three and one-half years.

The problem of exposing unerupted teeth for the purpose of aiding them to erupt has for many years occupied the attention of surgeons and orthodontists. Fifteen years ago a tooth was uncovered by lifting off only that small portion of mucoperiosteum which overlay the most accessible surface of the unerupted tooth. The small gaping opening was then usually stuffed with an iodoform pack, pressed so tightly that it was held by the resultant swollen edges of the wound. Those few surgeons who were called on to do several of these operations were discouraged by the tissue necrosis which followed this procedure. The wound was repeatedly packed, but secondary infection often occurred. Once healing began, however, it proceeded with such rapidity that often the uncovering operation was unsuccessful because of the resulting scar tissue.

Only an operator who has had to pack and repack these wounds can understand the brutality of such a procedure. The ordeal was so great for both child and surgeon that anesthesia often became necessary for the dressings.

The next development in the operation came as a suggestion from the orthodontist. Before the operation a large loop spring was constructed to overlay the area to be uncovered. This spring was so devised as to rest on the pack to prevent it from being dislodged. About that time the wisdom of packing wounds began to be questioned. Surgeons who used lighter dressings found this loop spring to be a great advantage since it permitted them to place a small dressing over the exposed tooth. It held this dressing in position and in this way avoided the painful repackings which exacted such a toll from the child and the operator.

At that time also it was not at all uncommon to use some sort of mechanical device to maintain the opening in the soft tissue which had been created. We were taught that modelling compound or base plate gutta-percha could be attached to such a loop spring and by pressure would maintain the opening which had been made. It was still customary in those days for the surgeon to drill a hole in the crown itself and insert and cement a pin into the drilled hole.

Some operators modified this by the combined use of loop and ligature. Often the only requirement for the oral surgeon was to uncover the crown sufficiently so that the hole could be drilled and the pin cemented.

Read before the New York Society of Orthodontists, New York, N. Y., March 24, 1936.

*Instructor in Oral Surgery, Harvard Dental School; Dental Surgeon at the Massachusetts General Hospital; Dental Surgeon at the Peter Bent Brigham Hospital, Boston.

Recently I was called upon to recement such a pin for a colleague. Drying the field, attempting to find the cavity and the actual cementation consumed so much time that my schedule for the day was entirely disrupted.

In the fall of 1927, while I was instructor in oral surgery and at the same time taking a postgraduate course in orthodontics under Dr. Fred R. Blumenthal, I was assigned an orthodontic patient with a malposed and unerupted maxillary canine. At that time it was customary to take an impression of the canine on the other side and to make a band for the unerupted tooth from it. Several weeks after the operation an attempt was made to cement a band, previously fitted to the opposite canine, and then readapted as well as was possible to the unerupted tooth. Being both the surgeon and the orthodontist I attempted to combine the two procedures, that is, to cement the band at the time of operation. This attempt was a failure. I therefore, at the same sitting, took a copper band impression of the unerupted tooth and temporarily applied base plate gutta-percha to the loop spring which had been previously prepared and which was supported on a lingual arch wire. Into this copper band impression, amalgam was packed, a die prepared and a cast made which fitted over the lingual aspect and the incisal edge of the unerupted canine. Fortunately the casting fitted well and stayed in position at its first cementing.

In the years following 1928, though practicing surgery, I had continued to maintain an interest in orthodontics, and had often volunteered to take a copper tube impression of the exposed tooth for the referring orthodontist while the tissues were anesthetized, thus enabling him to make his own amalgam die and to fit the band.

About that time (i.e., in 1928) surgical paste as dressing material came into practice. It has since then so greatly increased in popularity that it is now rare for us to use gauze alone as a wound dressing. At first surgical paste was incorporated in a gauze tape. Such a procedure had long been known in general surgery where boric acid gauze was an old favorite. These pastes, combining antiseptic and anesthetic properties, filled an important need and became popular. They allowed packs to remain for greater lengths of time without change and when they were renewed were less painful, since the lubricating jelly prevented their adherence to the tissue surface.

From this lubricated gauze dressing we soon learned that the lubricant itself was a good dressing material and so began to use it alone in bone cavities. In these partially uncovered teeth, however, it was difficult to keep it in place. One day it occurred to us that a celluloid crown form would be ideal for maintaining the dressing.

This prologue introduces the discovery of a procedure which, we believe, can be used to great advantage in uncovering teeth for orthodontic purposes. The method is extremely simple.

It consists first in completely uncovering the tooth;

Second, in using the crypt of the tooth bud as a guide for instrumentation so that a trough may be created through which the tooth may erupt;

Third, in maintaining this space by means of a celluloid crown form, filled with surgical dressing cream;

Fourth, in the judicious application and repeated renewal of this type of dressing to encourage and guide the eruption of the malposed, impacted, or merely unerupted tooth.

The successful performance of the operation depends largely on the temperament of the child. In some instances premedication may be necessary. In two cases of our series we found it necessary to resort to a general anesthetic.

It has been our experience that parents hesitate to have this procedure carried out if they are alarmed by the seriousness of the operation. We therefore assure both child and parent that the operation is a simple one although time-consuming. The first visit is spent in securing the child's confidence, in obtaining photographs and sufficient x-ray pictures to properly localize the tooth in question. The Clark method of localization and stereoscopic x-ray pictures may be used to localize the tooth further. Regular dental films, occlusal views, and lateral head plates are often helpful.

At the time of operation the materials are properly set up before the child is brought into the room, and no time is lost between seating the patient and preparing the field for operation. We use soap and water to prepare the field. In applying the drapes the field is isolated as completely as possible. The patient's hair and eyes are covered. This procedure has distinct advantages, and once the child's confidence is gained he is much better off if he is unable to see what is going on. Novocain is usually infiltrated about the tooth in question, although block anesthesia may be used if indicated.

EXPOSURE OF THE TOOTH

The tooth is exposed by a generous excision of the overlying mucoperiosteum. The flap is not laid back; it is completely excised. This is best carried out by the knife, mucoperiosteal elevator, and then by means of a punch or by electrosurgical scalpel. In the last two years in all our cases the excision of this soft tissue has been carried out with the electrosurgical scalpel. The loop dissects off the mucosa, and the unipolar needle inserted in the crypt actually coagulates and contracts the membrane about the crown, so it is more readily removed. In only two cases did we find it necessary to divest the crown of its bony covering by means of the chisel and mallet, and these cases were our oldest patients in whom maxillary canines were malposed high in the palate. Usually the dissection of this overlying bone can be carried out with hand pressure chisels, scalers, and tiny rongeurs. With a fine pair of rongeurs the overlying bone is dissected away until there is no overhang.

Maxillary canines require the removal of more bone than any other teeth, and are much more difficult. If the deciduous canine is still in position and its removal seems indicated at the time of operation, this provides an approach which somewhat simplifies the operation. If the deciduous tooth is carious and the space occupied by it is narrow, the operation is more difficult. If no space exists, it is even more difficult to provide suitable access. Whether or not the arch should be widened and the space for the canine created before surgery is attempted is a problem which must be given careful consideration. Exposure of the unerupted tooth must be complete and entirely adequate for access to its crypt.

ESTABLISHING THE TROUGH

When the tooth is thoroughly exposed, it is then possible to grasp the soft saclike portion of the tooth follicle with a fine hemostat. It must be torn away

Fig. 1. Fig. 2.

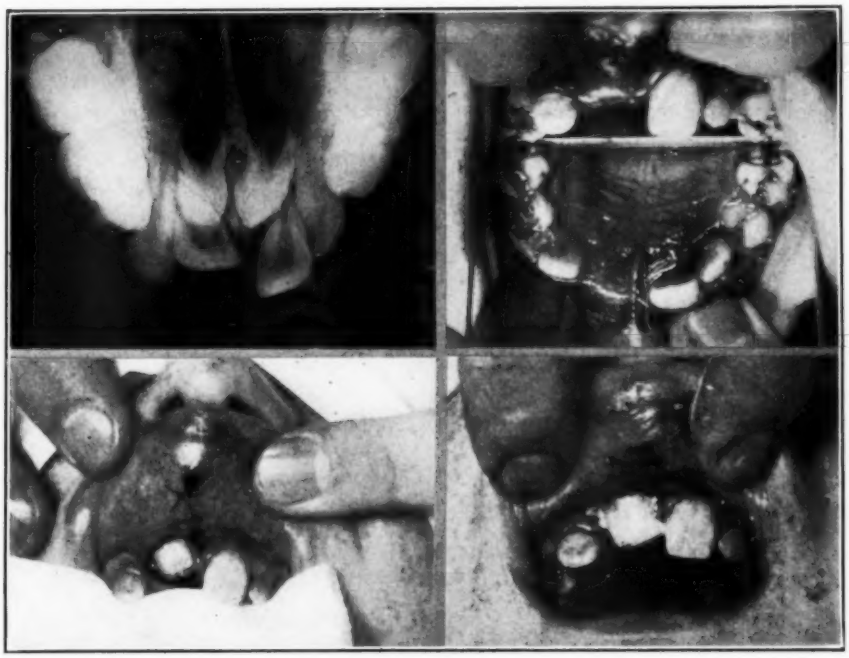


Fig. 3. Fig. 4.

Figs. 1-7.—Case 23.

Fig. 1.—Occlusal x-ray picture taken before operation.

Fig. 2.—Photograph taken before operation. A mirror is held within the mouth, and a reflection of the palate may be seen. Note the hypertrophied frenum.

Fig. 3.—At operation. Frenum removed, and tooth uncovered. Note the suturing in the line of incision. Note also the impingement of the mesial incisal corner against the root of the left central incisor.

Fig. 4.—At operation, the silicate crown form in position.

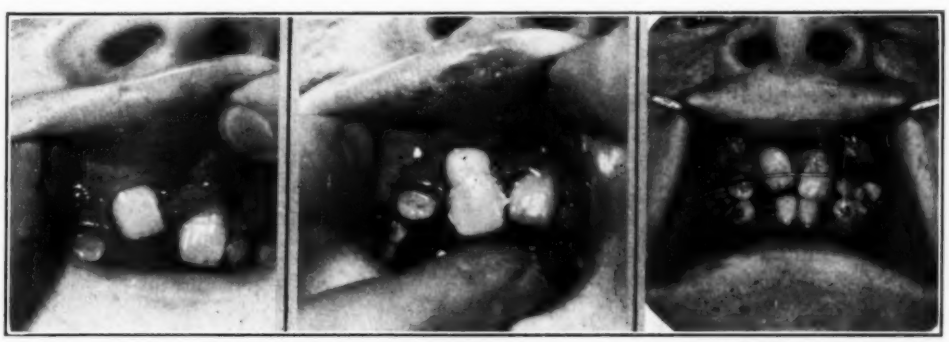


Fig. 5. Fig. 6. Fig. 7.

Fig. 5.—One week later. Note the change in the vertical direction of the tooth and that it is free from the other central incisor. Note also its downward growth.

Fig. 6.—Replacing the form at the same sitting, one week after operation.

Fig. 7.—Two and one-half months later, before any orthodontic stimulation other than the crown form had been applied to the tooth.

piecemeal. A pair of Columbia right and left scalers are useful for this procedure. It is then possible to enter the crypt, gradually pulling away portions

of this membrane until the cemento-enamel junction can be felt. Occasionally Whitten scalers and pyorrhea files will be found serviceable. Files such as those formerly used in the gingivectomy operation may be of help. It should be possible to pass a scaler completely around the exposed tooth in all directions. Occasionally, with maxillary canines which lie impacted against the lateral incisors, some difficulty will be encountered because the crown of the tooth impinges so tightly. Force should not be used, however. It is wiser to leave the point of contact and to adjust or adapt the crown form later so that this contact point is avoided.

ADJUNCTS TO TREATMENT

Wiring.—Occasionally when the impacted tooth has lain hard up against another, we have used a brass wire for separation. This may be applied at the time of operation and in conjunction with a form, once sufficient space has been created. On the following visit, however, the crown form can be forced by the point of contact and permitted to enlarge the space.

Supernumerary Teeth.—(See Fig. 1.) The uncovering is often complicated by the presence of supernumerary teeth of various shapes. The supernumerary tooth often makes the operation simpler, since its removal creates a larger bone cavity. If the removal of the supernumerary tooth has been a previous operative procedure and sufficient time has elapsed, scar bone may have formed and will make the operation more difficult. The supernumerary tooth should be removed at the time of uncovering and the space maintained.

Scar tissue may likewise hinder eruption, especially if previous attempts have failed to maintain the space. It surrounds the entire tooth and the cryptic membrane itself becomes a hard fibrous capsule which offers considerable resistance to removal.

MAINTAINING THE TROUGH

Having first carefully dried the exposed tooth and crypt, the surgeon visualizes the newly uncovered tooth and selects the crown form of the proper size. An inexpensive pair of band stretching pliers are flamed until they are moderately hot. The neck of the crown form is then stretched so that it is as wide as the greatest width of the form. The neck of the form is cut with a pair of crown-and-bridge scissors to such a bevel that it will slide by the projecting mucoperiosteum (since of course, the tooth lies in an unnatural position). The crown form is so adapted that it fits snugly on the crown of the tooth and is retained by the tightness of the fit. It need not be forced on completely. In some cases there is a distinct advantage in leaving the form long, since muscle force will tilt the tooth into proper alignment. We also believe that if the form is left long the stimulation of mastication is beneficial and causes an earlier eruption of the tooth. This phenomenon we do not fully understand. Is the masticatory effect in itself sufficient to cause eruption, or does each movement of the form force it further between the tooth and the bone and cause the tooth to be extruded? This is a problem, however, which this paper cannot attempt to answer.

Only rarely have we found it necessary to suture the form to the adjoining mucosa in order to keep it in position. For the most part it has been retained by means of its fit on the crown. In several instances a light spring from the arch wire has been adjusted to rest very gently on the form, thus preventing its dislodgment. Care has been taken, however, to prevent the application of any considerable amount of pressure. In some cases a circumferential wire has been twisted about an adjoining tooth and the projecting ends have been allowed to rest on the form to prevent its being displaced. (Fig. 14.)

Fig. 8.

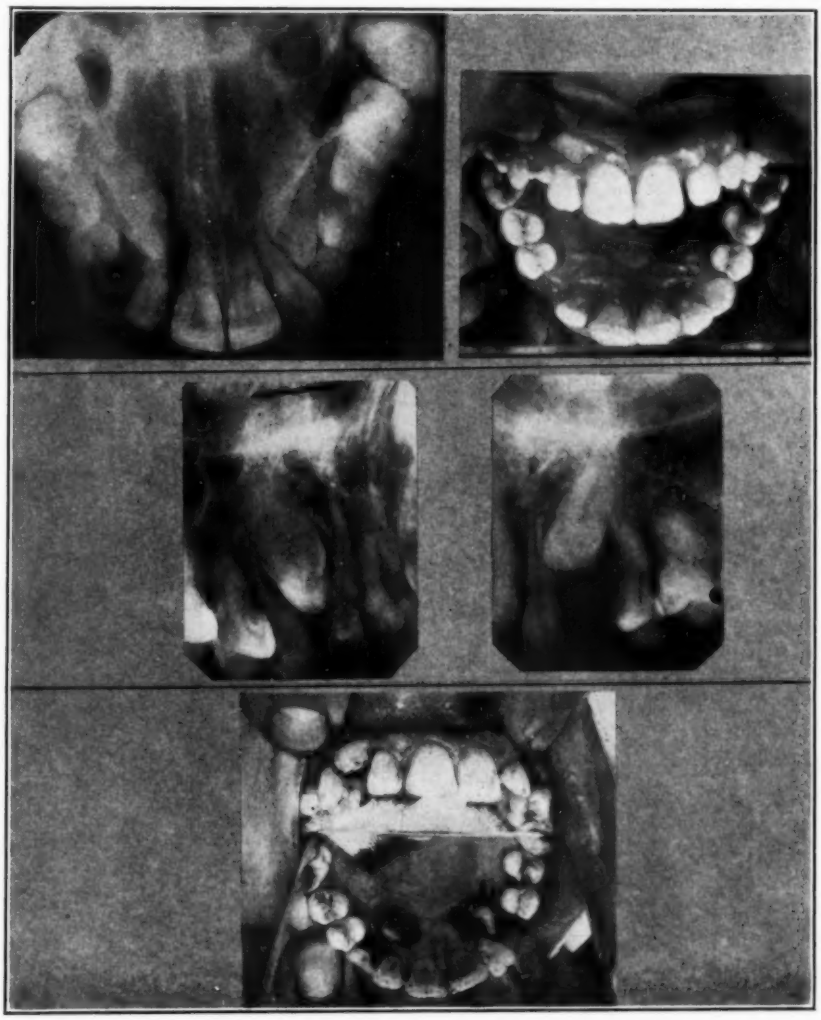


Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Figs. 8-17.—Case 26.

Fig. 8.—Patient 26 years old. Preoperative occlusal view. Note that film is viewed in the direction of the x-rays. The small intraoral films which follow are all viewed as customarily; i.e., from within the mouth outward.

Fig. 9.—Preoperative photograph; the patient holding a mirror within the mouth. Note the presence of the left deciduous canine.

Fig. 10.—Preoperative x-ray film, left cuspid.

Fig. 11.—Preoperative x-ray film, right cuspid.

Fig. 12.—Photograph made during operation.

After the crown form has been adapted, it is then filled with an ointment and pressed into place. This ointment is of great value for several reasons.

The grease helps to create a suction which maintains the form in place. It is obtundant and slightly antiseptic. It also prevents the accumulation of saliva and food. Our experience has proved that forms may be left on without changing the dressing for a week or ten days. We do not believe it makes any essential difference what ointment or cream is used, provided it contains the ingredients which produce the desired effect. For many years we have used as a surgical dressing, a cream of such consistency that at moderate temperature it is much the same as ordinary butter. In fact, this material responds to heat just as butter does. At body heat it is semisolid. If the tube is held under hot

Fig. 13. Fig. 14.

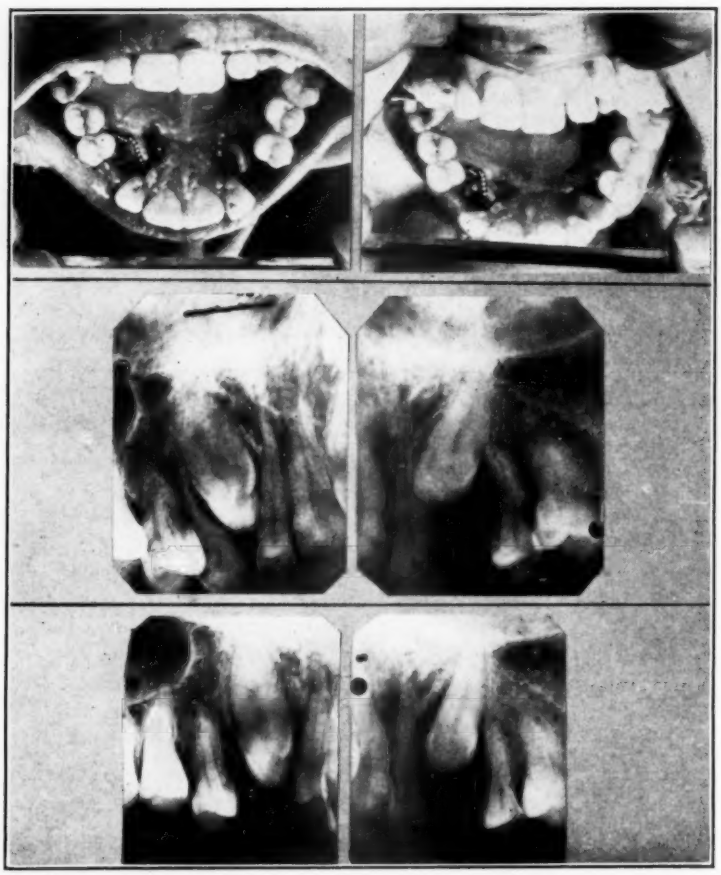


Fig. 15.

Fig. 16.

Fig. 13.—Note the wire from the maxillary first premolar which projects over the partially erupted cuspid. The forms have here been removed.

Fig. 14.—A wire projects from the adjoining right premolar to help hold the form in place. Note left crown form.

Fig. 15.—X-ray pictures taken before operation.

Fig. 16.—X-ray pictures taken ten weeks after operation. Note the change in the direction of the erupting teeth as well as their descent.

tap water for a few minutes the cream becomes nearly liquid. It has been our practice to follow this procedure and to apply the cream to the crown form in a liquid state. In a few seconds it is semisolid. It is then applied to the tooth and is sprayed with cold water. The excess cream is then wiped away, and the patient is ready for dismissal. It is important that this process be well understood. This celluloid crown form containing the semisolid cream is not

cemented on in any sense of the word. Surgical packs and other materials which become hard after their application to the tooth should be studiously avoided. The only reason for filling the form with any material is for the germicidal effect and in order to increase the suction by which the form is held in position. Many solid substances would be likely to act as an irritant and offset the value of the crown form. The formula of the paste which I use is as follows:

1. Camphor	6.5 parts
2. Metacresol	3.5 parts
3. Petrolatum (melting point 40°—50° C.)	50.0 parts
4. White wax	10.0 parts
5. Hydrous wool fat (lanolin)	30.0 parts

A propietary cream called obtundia and manufactured by the Otis Clapp Company of Boston has satisfactory consistency and antiseptic qualities.

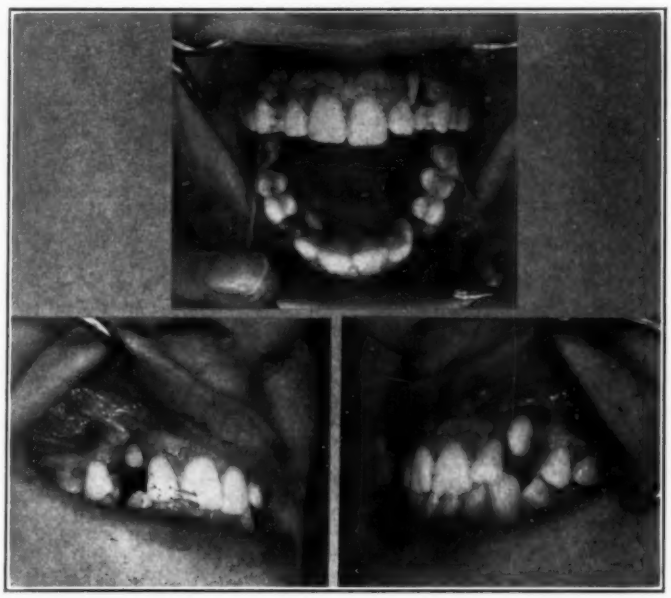


Fig. 17.—Front view, right side and left side views taken ten weeks after operation.

UNTOWARD RESULTS

In only 3 cases of our 51 (70 teeth) have we seen any disagreeable results:

1. Denuding of adjoining roots. One must be extremely careful not to injure the roots of the tooth on which the unerupted tooth is impacted. This needs no further elaboration since every surgeon who has removed any number of impacted maxillary canines knows that even if the impacted tooth is completely removed without orthodontics being considered, a denuded root is occasionally an aftermath against which the surgeon must constantly guard. Incorrect application of elevator or curette may do irreparable damage.

2. Beyond the control of the surgeon is the pressure from the impacted tooth which may so resorb the root of the adjoining tooth upon which it is impacted that regeneration of the alveolar bone will not occur over the cementum. Case 8 is an example of this sort.

3. The third complication which we have seen is secondary infection. This occurred in Cases 8, 13, and 21. In all these cases the invading organisms seem to be those of Vincent's infection, and the complication responded to simple dye treatment and hygienic care.

The form which has been placed at operation may be allowed to remain for two, six, or even ten days, depending on the ease of access and whether any complications have developed, and afterward need not be changed more than once a week. It should be replaced at intervals until at least a month has elapsed from the time of the operation. At that time it can be determined whether the tooth should be banded or whether it will erupt with or without the aid of a simple spring. If a band is decided upon, it should be promptly applied at this time. In the absence of a band it may be advantageous for the form to be worn for several more weeks.

SUMMARY

This operation is one which we feel is an important adjunct to the treatment of the unerupted tooth. The crown form technique diminishes the amount of time required for aftercare and for orthodontics, and is valuable in artificially causing the eruption of infected teeth.

PRINCIPLES AND TECHNIQUE OF MODIFIED EDGEWISE ARCH MECHANISM

ALEXANDER SVED, D.D.S., NEW YORK, N. Y.

INTRODUCTION

ON THE second of June, 1925, the late Dr. Angle brought a new orthodontic appliance before the Edward H. Angle Society of Orthodontists, under the title, "The Latest and Best in Orthodontic Mechanism."[1] This appliance consisted of a rectangular arch applied edgewise to suitable brackets, which were soldered to bands cemented on every tooth. It was a modification of the ribbon arch appliance, and it differed from it in four main particulars:

1. In the labial or buccal opening of the horizontal slots in the brackets, which were occlusal or incisal in the ribbon arch mechanism.

2. In the use of ligatures for securing the rectangular arch into the brackets, instead of the tiny spikes.

3. In the edgewise application of the rectangular arch which is applied flatwise in the ribbon arch mechanism.

4. In the maintenance of the ideal appliance form throughout the treatment, which in the ribbon arch technique was passively formed to the malformed dental arch and gradually changed to the ideal form during treatment.

These modifications increased the efficiency of the new appliance, and several cases were reported which were successfully corrected with it in an astonishingly short time.

This method of rapid treatment, however, was not looked upon favorably by many orthodontists; and on account of the opinions prevailing at that time regarding the rate of tooth movement, the edgewise appliance was not universally accepted. Even at the present time only a small group of men avail themselves of the advantages which may be gained through the use of this mechanism, and the great majority is still content with the use of the well-tried plain labial and lingual appliances. I must admit that I was among those who would not adopt the use of the edgewise appliance in practice because there seemed to be too much tissue irritation from bands and tissue destruction from unpredictable excessive forces. For several years I have studied the advantages and disadvantages of this appliance; and, while the results obtained by other men constantly increased my respect for the mechanism, the fear of applying excessive forces to the teeth kept me from using it in my practice.

The benefits to be derived from the use of this appliance prompted me to investigate the principles of its operation more carefully. It became clear at

Presented before the New York Society of Orthodontists, Nov. 16, 1937.

once that the tissue irritations frequently seen may be caused either by ill-fitting bands or by rigid attachments, and in both instances the condition of the tissues may be aggravated by excessive pressures on the teeth. It was also recognized that, while the elimination of the rigid attachments would have the effect of reducing the forces which may be delivered to the teeth, the application of force by torqueing or twisting the appliance would become ineffective. These considerations gave rise to certain modifications in the technique of the edgewise arch mechanism as it was originally presented, and resulted in the development of a newer orthodontic mechanism which affords me more satisfaction than any other appliance I have had the pleasure of using in nearly twenty years of practice.

In order to utilize the advantages of the edgewise arch appliance, an improved band technique had to be developed, and the alignment brackets had to be modified in such a manner as to remove all rigid attachments between the arch wire and the teeth. With these modifications, however, the technique employed for the movement of the teeth materially changed. Appliance manipulation was reduced to the minimum, and the only requirement in the use of the new mechanism is the maintenance of the ideal appliance form during treatment. The ideal appliance form was described in Angle's original work, but it was not made definite, so that at present most operators depend upon the Hawley charts for shaping the appliances. This, however, reduces all cases to a common type; therefore a new method of arch predetermination has been devised which enables us to determine the characteristic arch form for every individual. Thus, the principal changes from the original edgewise mechanism comprise:

1. Modification of band technique.
2. Modification of brackets.
3. A new method of arch predetermination.

Before entering into a discussion of the methods of treatment, these changes will be discussed in detail.

MODIFICATION OF BAND TECHNIQUE

The positions of the bands on the teeth and the positions of the brackets in relation to the bands were minutely described by Angle. In this new mechanism the bands are similarly placed, and the brackets are soldered to the bands at the center of their labial surfaces. The bands are so formed that they cover the middle third of the teeth regardless of their malposition. The important difference is in the making of the bands, which in itself is a very simple matter provided the principles which must be followed are understood. If we analyze the latest method of band forming (Fig. 1) given to us by Angle, it becomes clear that, while the method employed in stretching the band material around the tooth is sound, one important point has been overlooked. The improved band forming pliers of Angle cannot stretch the band material around the tooth beyond a certain limit, because the band material is locked between the tooth and the forming beak of the pliers, and a perfect fit cannot be obtained (Fig. 2). The reason for this is more clearly

seen when it is explained that, because of the locking of the band material the tension in that portion which surrounds the tooth is always less than in the portion included between the plier-beaks. As the tension is increased the portion of the band material included between the two beaks of the pliers is stressed beyond its breaking strength, and fails before the band is completely formed and adapted. To obviate this, lubrication of the forming beak was recommended; but, even if this is done, the band material fails prematurely at some point between the plier-beaks, usually at one of the sharp bends. This unfavorable condition has been overcome by a slight im-

Fig. 1.

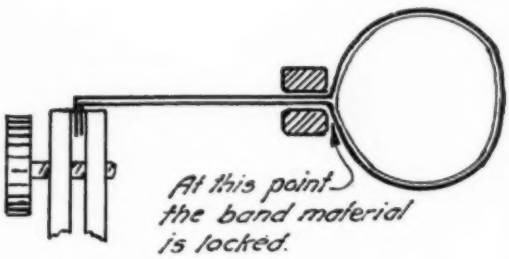


Fig. 2.

Fig. 3.

provement in the design of the forming beak of the band-forming pliers. Fig. 3 illustrates this improvement, which consists of three slots in the forming beak instead of one, with the middle portion slightly raised. The band material is fed into the two outer slots forming a loop outside the forming beak, and the two ends are securely locked into the other beak by means of a thumb screw. The loop is placed over the tooth, and tension is applied to the band material. The raised middle portion provides a bearing surface against the tooth, and permits free sliding of the band material without locking. With this arrangement the band material is stretched uniformly through-

out its entire length, and if burnished while under tension it can be made to fit the labial and proximal surfaces of the tooth most accurately. When these three surfaces are sufficiently well-fitted, the partially formed band is removed from the tooth and both strands of the band material are transferred from the outer slots into the middle slot (Fig. 4). By replacing on the tooth and applying further tension, the lingual surface of the band is completed. Thus, the band is formed in two parts: first the labial and proximal surfaces and then the lingual surface. Originally it was thought that two pliers would be necessary to form a band in this manner, but it was possible to incorporate the two instruments into one.

In this connection it must be pointed out that the stretching of the band material may not always result in a perfect fit. When a depression exists on a surface of the tooth to be banded, the stretching of the band material must

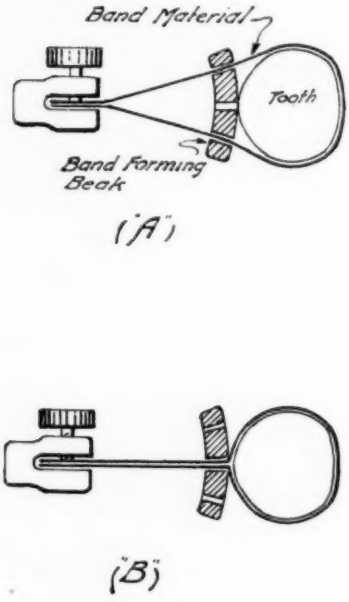


Fig. 4.

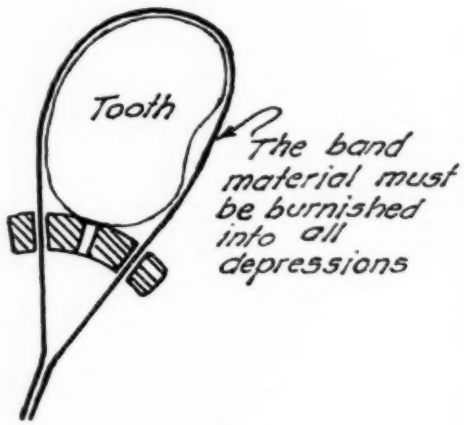


Fig. 5.

be supplemented by burnishing. This is illustrated by Fig. 5, which shows that tension alone is not sufficient to fit the band material to the tooth, and that it must be burnished into all depressions. Furthermore, after the band is cemented into position, all free edges should be burnished with suitable instruments before the cement hardens.

By following the method of band forming just described all bands can be made to fit very accurately, and the tissue irritation resulting from bands can be entirely eliminated.

MODIFICATION OF BRACKETS

The original alignment bracket used in conjunction with the edgewise arch is a very rigid attachment. While it is very efficient in producing root movements, it is extremely violent in its action. In a report presented to this Society[2] it was shown that, if the edgewise arch is locked into the original

type of brackets, the reaction of the teeth may reach several pounds in magnitude. It was also shown that in free attachments the reactions brought about by the same wire are very much reduced in intensity.

These facts suggested a necessary change in the alignment brackets, and an attachment has been designed in which the rigidity has been entirely eliminated. On account of the difficulty in the manufacture, however, the new design was altered by Professor R. C. Brumfield,[3] of Cooper Union, and the bracket in its final form answers all the requirements of treatment. It differs from the original bracket in the form of the slot, which instead of being a horizontal channel is formed by two opposing wedges (Fig. 6). This arrangement permits the turning of the arch wire in the slot, so that the relationship between the axis of the tooth and the arch wire can be changed; this is not possible with the original bracket. On account of the rounded edges, the brackets are well tolerated by the lips and the cheeks, and the grooves

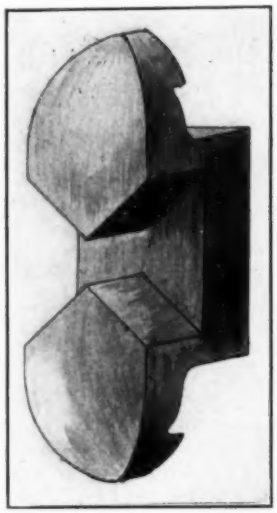


Fig. 6.—The improved bracket.

behind the upper and lower arms of the brackets provide a very secure attachment for the ligatures. The improved bracket allows every possible tooth movement which may be required, and its use will be described under the discussion of treatment.

PREDETERMINATION OF INDIVIDUAL ARCH FORM

The philosophy upon which this new method of treatment is based demands that the ideal form of the metal arches be maintained throughout the treatment. In order to be able to do this it becomes necessary to predetermine the characteristic dental arch outline of the individual. On account of the countless variations in the forms of dental arches it was held impossible to devise a geometric method which would give satisfactory results. The available methods, notably those of Bonwill, Hawley, Stanton, and also my own earlier efforts, gave a constant average form, which could not be applied to the individual. In the absence of a more accurate predetermination these

were used as reasonable approximations, and were always altered by the operator to meet the conditions. It is my belief that even these approximations were better than the ambiguous descriptions found throughout the orthodontic literature. Angle defined the line of occlusion as "Being the line with which, in form and position according to type, the teeth must be in harmony, if in normal occlusion." Now, the line of occlusion is merely another name for the arch form, and the definition does not convey a definite thought to our minds; therefore it is ambiguous and wholly inadequate. Such definitions as this, of which we find many examples in orthodontic literature, are responsible for the differences of conceptions. Angle had a definite thing in mind, but he failed to convey it to his pupils; this he, himself, recognized; for he wrote: "Greatly to my surprise, I find that there is practically no close agreement among orthodontists as to what constitutes normal of dental arch forms. If asked to demonstrate the form of a normal upper dental arch, nearly all will give a semi-ellipse, or a horse-shoe pattern, with the central and lateral incisors and the cuspids all of the same height and in the same

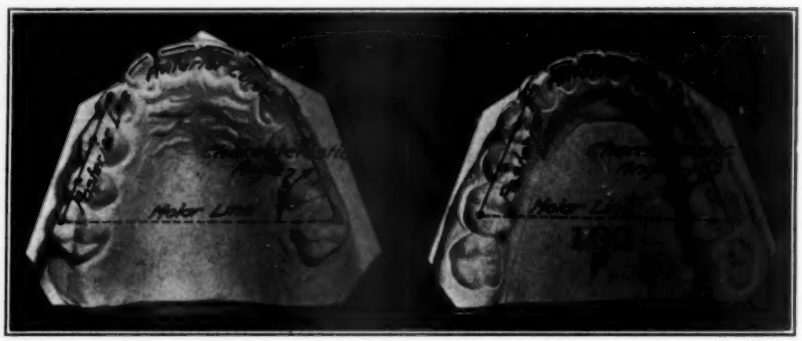


Fig. 7.

alignment, and nearly always the bicuspids buccally to normal. Indeed, these are overwhelmingly the patterns of upper arches and relations of teeth shown in corrected(?) cases of malocclusion in the current literature and in our so-called up-to-date textbooks, and even in some of the drawings of works on dental anatomy."

In the light of Angle's definition, this is not so surprising. In the days when his book was written, his definition was perhaps the best available, but the procedures in modern orthodontics demand a far better understanding of the characteristics of arch form. Those who oppose mathematical and geometrical solutions are not sufficiently well versed in these sciences to be able to render an opinion. The pointed references to "machine-made diagnoses," and the dismissal of the subject by the statement that our problems are biologic and not mathematical, are not valid. Such attitudes retard the progress of orthodontic development.

It is my pleasure to present a new method of arch predetermination, which has the distinction of being simple and easy to master, and of giving results typical of the individual. It is based on the studies of the general

properties of human dental arches, and not on averages. If we examine a large number of dental arches, we will note that in both upper and lower jaws, the incisal edges of the anterior teeth included between the canines are placed along a curve which resembles a circle (Fig. 7). Whether the anterior curve is a circle or another curve is not important, but a circle can be chosen which very nearly fits the anterior portion of the arch. This is true of all dentitions regardless of arch form or the type of individual; therefore the first general property of all human dental arches is that the anterior teeth included between the tips of the right and left canines are placed along a curve which resembles a circle. The radius of this circle may be smaller or greater in different individuals; nevertheless the approximate circular arrangement is present in all. Further examination will reveal that the summits of the buccal cusps of the posterior teeth included between the tips of the canines and the buccal groove of the first molar on the same side are placed along a straight line. This in reality is not a straight line, but it closely approximates one. This condition is present in all arches regardless of type or form; therefore the second general property of the human dental arch is that the summits of the buccal cusps of the posterior teeth included between the tip of the canine and the buccal groove of the first molar on the same side are arranged on a straight line. This line shall be referred to as the posterior line.

If we draw an imaginary line connecting the buccal grooves of the right and left first molars, we obtain the molar line. Upon examination of a large number of arches it will be found that the angle made by the molar line and the posterior line varies widely in different individuals. This angle is the characteristic angle. If the arch is long and narrow, the characteristic angle is large; if the arch is broad and short, the characteristic angle is more acute. Since this varies in different individuals, it must be the factor which determines the type of the individual; therefore the third general property of the human dental arch is that the type of the arch is determined by the characteristic angle.

From these general properties it is possible to reconstruct any normal dental arch with the greatest degree of accuracy. If we consider that the four points representing the tips of the two canines and the buccal grooves of the two first molars must be in the same plane, then it will be seen that it is possible to find a circle which will pass through those four points. This circle may indicate the correctness of the theory of spherical occlusion, or it may only be a geometric condition, for a circle can be drawn through the extremities of any two coplaner straight lines. In this particular instance, the two coplaner straight lines are the posterior lines. It was found that in all normal arches the anterior curve coincides with the circle passing through the extremities of the posterior lines, and this condition seems to confirm the theory of spherical occlusion.

If a line is drawn from the tip of the canine on one side parallel to the posterior line on the other side, we obtain an isosceles triangle whose base is equal to the difference between the molar width and the canine width (Fig.

8). The base angles of this triangle are equal to the characteristic angle, and the two equal sides have the length of the posterior lines. This isosceles triangle can be formed at both extremities of the molar line. Here it must be noted that the vertex of the outer base angle of each triangle corresponds to the buccal groove of the first molar and that the vertices of the triangles represent the positions of the tips of the canines. If the canine and molar widths of the arch were known, it would be a very simple matter to reconstruct the normal arch outline. These distances, however, can be expressed accurately only by complex mathematical formulae, and for that reason the following close approximation is offered.

If the molar width is represented by W, the canine width by C, and the difference between them by D then:

$$W = C + D$$

In other words, the molar width can be calculated if C and D are known. Now, D can be easily determined by measurement as will be described later, but the value of C must be estimated from the known fact that the length of a

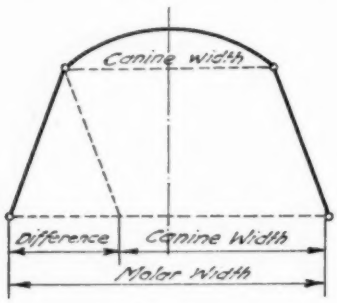


Fig. 8.

chord is always less than the length of the subtended circular arc. The canine width C is the chord of the anterior curve, and the length of the anterior curve can be determined by measuring the mesiodistal diameters of the anterior teeth.

If U represents the sum of the mesiodistal diameters of the central incisor, lateral incisor and mesial half of the canine, then, 2 U represents the length of the anterior curve, accordingly:

$$C \text{ is less than } 2\ U$$

or

$$C = 2\ U - k$$

where k is some constant value depending on the type of the arch. Therefore, the expression for the molar width will take the form:

$$W = 2\ U - k + D$$

The value of k varies from 2 to 6 mm., depending upon the type of arch we are dealing with.

The value of D is determined by the condition that during development the growth of a part takes place parallel to itself. This was shown to be true

by the analysis of the Wallace series, and also by the reinterpretation of Hellman's measurements of the human face.[4] This is of greater importance in orthodontics than may first appear. By far the greatest percentage of cases placed in our care represent cases of underdevelopment, and it may be stated as an unalterable rule that in order to establish normal occlusion each lateral half of both upper and lower jaws must be expanded parallel to itself. This gives us a method for the determination of *D*. Because of parallel growth

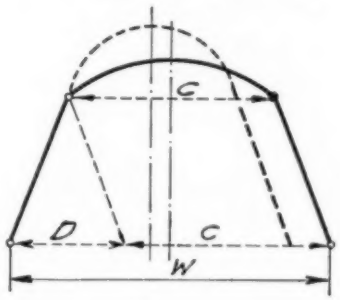
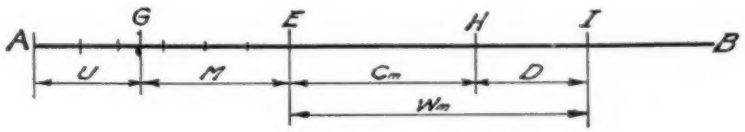


Fig. 9.—Diagram showing that during parallel growth the difference between the molar and canine widths remains constant.



$$W = 2U - K + D \text{ (millimeters)}$$

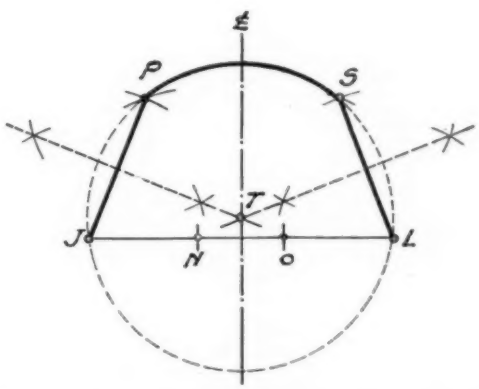


Fig. 10.—Diagram showing construction of individual arch form.

the difference between the molar width and the canine width remains the same whether the teeth are in normal occlusion or in malocclusion (Fig. 9). Therefore, the value of *D* is determined by taking the difference between the molar width and the canine width regardless of the condition of occlusion. The recognition of this fact is of extreme importance to us, and its practical application will influence our methods of treatment in the future.

The method here given for determining the approximate value of the arch width enables us to predetermine the characteristic arch form of the indi-

vidual, with a precision consistent with our demands. It is no longer necessary to use one type of arch form for all individuals, and the numberless variations met with in practice can be satisfactorily accounted for.

The following practical procedure is suggested (Fig. 10):

(1) Draw any line AB and mark A as the starting point.

(2) Measure the mesiodistal diameters of all teeth from central incisor to the buccal groove of the first molar. As each measurement is taken, mark it off successively on the line AB in regular order, using A as the starting point. The length of the line AE represents the sum of the mesiodistal diameters of all teeth included between the median point and the buccal groove of the first molar on one side.

(3) Measure the mesial half of the canine and mark it off from the mesial end of the canine measurement on the line AE. Then measure the distal half of the canine and mark it off from the distal end of the canine measurement on the line AE. If these measurements are accurately made, the two points thus obtained must coincide. This point represents the position of the tip of the canine, and label it G.

(4) Measure AG and GE in millimeters, and find:

$$U = AG$$
and
$$M = GE$$

(5) Measure the canine width on the model of malocclusion and lay it off on the line AB from E to H. Then measure the molar width on the model of malocclusion and lay it off on the line AB from E to I. The distance from H to I is equal to the difference between the molar width and the canine width. Therefore:

$$D = HI$$

Measure this distance in millimeters.

(6) Calculate the normal molar width of the arch by using the formula:

$$W = 2\,U + D - k$$

(7) Draw a line JL equal in length to the calculated width of the arch. Then the points J and L represent the position of the buccal groove of the right and left first molars in normal occlusion.

(8) Mark off the distance JN and LO equal to the measurement D.

(9) With the measurement M as radius, draw intersecting circular arcs from points J and N as centers. Repeat this operation on the opposite side using points L and O as centers. The points P and S thus found represent the positions of the tips of the canines.

(10) Draw lines JP and LS. These lines are the posterior lines of the normal arch.

(11) Construct the perpendicular bisectors of the posterior lines, and prolong them until they intersect. The point of intersection T is the center of the anterior curve, which is an arc of a circle.

(12) Using T as a center, open the compass to point P, and draw the circular arc PS. If the construction is carried out accurately, the circle will also

pass through the points *J* and *L*. The form indicated by the heavy lines is the predetermined arch form, which is different for every individual.

The extreme variety of forms obtainable by this method is shown by Fig. 11, which depicts normal arches of different types, with the construction for the arch determination carried out over the photographs of the arches. This proves that the ultimate arch outline for any case can be predetermined with the greatest degree of accuracy by a geometric method. The criticism that mathematical or geometric methods reduce all individuals to a common type is no longer valid. At this time we have a great need for a reliable arch predetermination, and it is my belief that the method here given will answer all practical requirements.

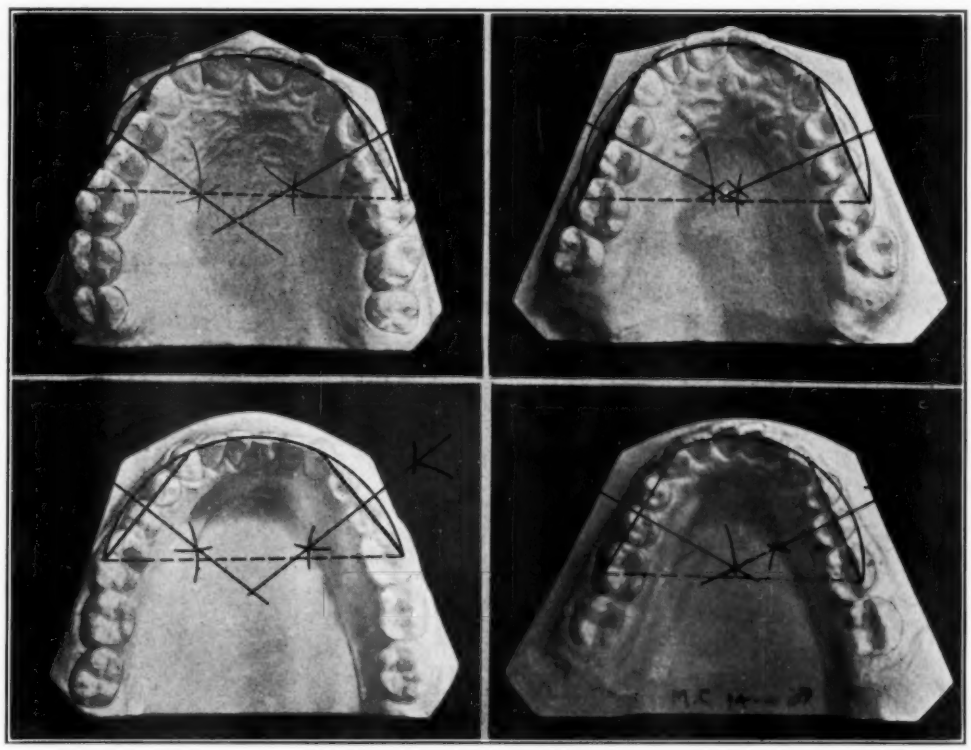


Fig. 11.

In order to utilize this new method of arch predetermination it becomes necessary to explain how the form of the metal arches used in the modified edgewise arch technique can be accurately determined. It is clear that the arch form given by the measurements of the teeth is the ultimate arch form, or the arch form of the completed case. Because of the many bands used, the dimensions of the arch must be greater during treatment than after the case is completed, therefore, allowances must be made for the spaces taken up by the parts of the appliance. If the molar bands are made of a material of 0.006 inch in thickness, and all other bands of 0.003 inch thickness, then the measurement *U* will be increased by approximately 0.5 mm. and the measurement *M* by 0.7 mm. In these additions an extra allowance of 0.001 inch is made for every cemented surface. This means that the molar width of the

arch is 1 mm. wider during treatment when the bands are in position; and for this reason, for the predetermination of the metal arch forms, the appliance arch form is constructed in exactly the same manner as it was previously described, but using the increased dimension of *U* and *M*. The measurement *D* can be considered to be the same without appreciable error. The form of the metal arch is larger than the form indicated by this predetermination, because the arch form is taken along the summits of the buccal cusps of the posterior teeth and the incisal edges of the anteriors (Fig. 12). Every posterior tooth has a buccal curvature so that the points where the brackets are soldered are considerably outside the predetermined form of the arches during treatment. In addition, the metal arches are displaced further buccally and labially by the combined thicknesses of the cement, the band material, and

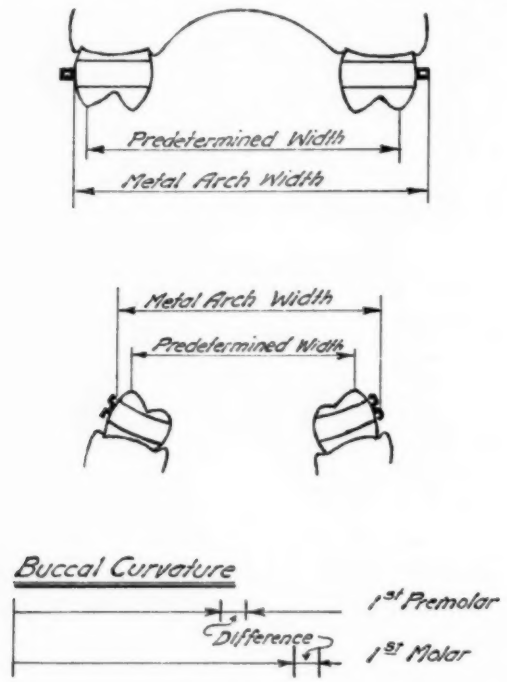


Fig. 12.

the bracket. It was found that in the anterior region the radius of the anterior curve should be increased by 2 mm. on the average, in order to determine the radius of the anterior curve of the metal arch. The variation in different cases is so slight that an average of 2 mm. increase in the radius of the anterior curve is sufficiently accurate. In the posterior region the variation is greater, and is measurable after the bands are cemented into position. In order to measure the buccal displacement of the metal arch, draw two straight lines, and mark off a starting point on each. Measure the distance between the summits of the buccal cusps of the first premolars by means of a pair of dividers, and lay it off from the starting point on one of these lines. Then place one point of the divider at the base of the bracket on one of the first premolars and measure to the outside of the bracket of the opposite first premolar. Lay this distance off from the starting point of the same straight line.

The difference between these two measurements represents the total increase of width from the predetermined arch form to the metal arch form in the first premolar region. Divide this difference by 2 and obtain the increase in width on one side in the first premolar region. Repeat these measurements at the buccal groove of the first molars. Usually the increase in width is the same in the molar region as it is in the premolar region, and in that case the metal arch form is parallel to the predetermined working arch form. If, however, a great difference exists, the metal arch is not parallel and proper allowances must be made.

It must be noted that the increase in width is always greater in the mandibular arch than it is in the maxillary arch, and it is important to mention that the mandibular metal arch is nearly the same size as the maxillary

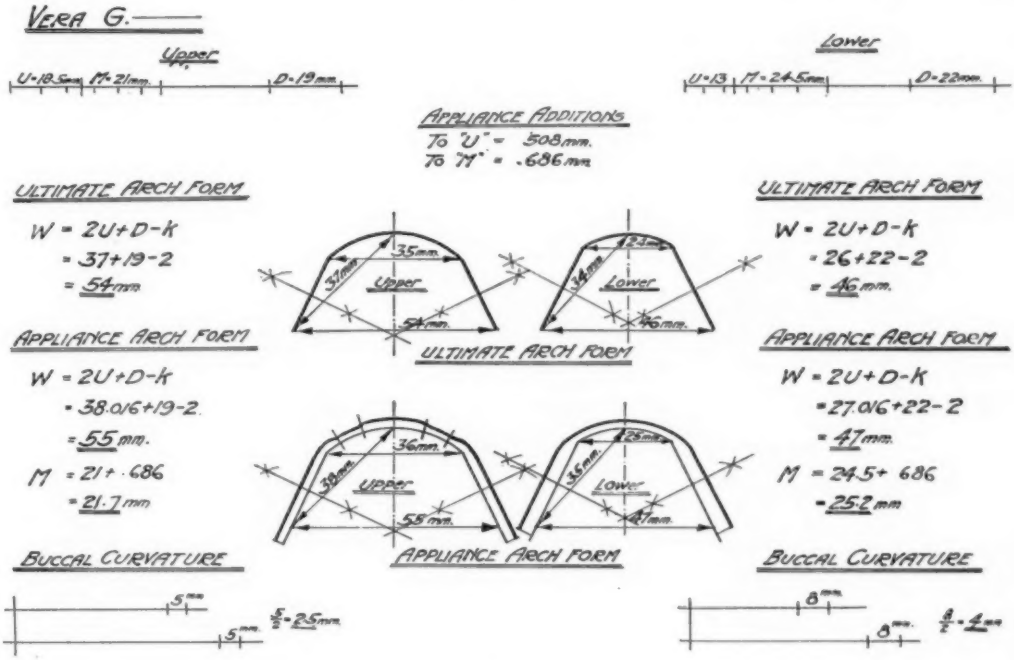


Fig. 13.

one, because of the greater buccal curvature of the posterior teeth. The arch is made 5 mm. longer on each side to provide sufficient length for the tubes (Fig. 13). Occasionally it becomes necessary to cut off the arch ends, especially if the malformed dental arch is too narrow. When the light gauge arches are used, it is not necessary to bend in the wire over the lateral incisors, but with the rectangular arch wire it is best to follow the rules laid down by Angle.

TREATMENT OF CASES WITH MODIFIED EDGEWISE ARCH MECHANISM

It has been pointed out that the principal difference between the edgewise arch appliance of Angle and this new appliance is in the construction of the brackets. Upon superficial examination it may be said that this is merely another appliance added to those which are already in use, and that

the advisability of its adoption is questionable. It will be shown, however, that this is more than just another appliance, and that it possesses certain advantages not found in other mechanisms. The difference between the ribbon arch and the edgewise arch appliances of Angle is also in the construction of the brackets, but the fundamental principle of their operation is radically different. The edgewise arch appliance is by far the more efficient of the two, and the results obtained by its use are more satisfactory. The great disadvantages of both these appliances is the rigid fixation of the arch wire in the brackets, which undoubtedly is responsible for the undesirable tissue reactions and root resorptions often seen in the radiographs of treated cases. The manipulation of these appliances is extremely difficult, and the intensity of force delivered to the teeth may reach alarming proportions.

Fig. 14. Fig. 15.

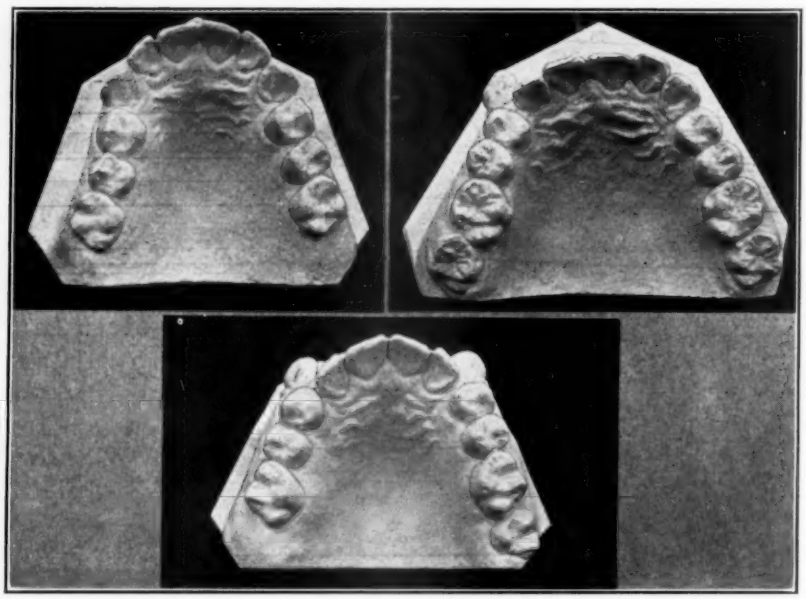


Fig. 16.

The treatment of all cases by the modified edgewise arch mechanism may be generalized as follows:

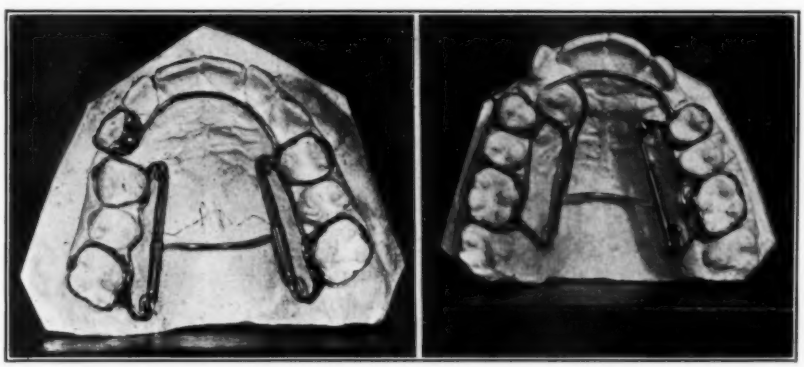
1. Establish symmetry of the arches.
2. Establish harmony between the maxillary and mandibular arches.
3. Perform individual tooth movements.
4. Establish normal mesiodistal relationship between the upper and lower jaws.
5. Retain the newly established relationships.

Asymmetry of the lateral halves of the arches is the first condition which should receive attention, for the new appliance is not capable of correcting asymmetries efficiently. This applies to all other labial appliances equally, and difficulties will be experienced in the correction of asymmetrical cases. These may be brought under two general groupings:

a. Unilateral underdevelopment, or greater underdevelopment on one side than on the other (Fig. 14).

b. Unilateral mesial drift of the posterior teeth (Fig. 15). To this group we may add the class of cases with bilateral mesial drift of the posterior teeth (Fig. 16). While these do not represent asymmetries, they must receive similar preliminary treatment. The preliminary treatment consists of reducing the asymmetrical condition by means of the expansion bar appliance (Fig. 17), which can be designed for the distal movement of the teeth on one side or for unilateral expansion. This appliance will correct these difficult conditions most expeditiously.

The establishment of harmony between the arches is a very simple matter with the modified edgewise arch mechanism. From the normal arch outline the form of the arch wire is determined, and it is maintained throughout the treatment. In order to reduce the forces delivered to the teeth, the first metal arches used should be made of very light chrome alloy round wires, 0.016 inch in diameter. These are woven into the brackets and secured by means of 0.008 inch stainless steel ligatures. Thus, the first arch wires are twice the thickness of the ligatures, and their action is so gentle that both maxillary



A. *B.*

Fig. 17.—The expansion bar appliance: *A*, unilateral expansion; *B*, distal movement.

and mandibular arch wires are given to the patient at the same time. The discomfort after the first application of force lasts but two days, and no violent reactions have been reported. The treatments thereafter are given one month apart; and, when the first arch wires are removed a month later, they may be deformed to a greater or lesser extent, depending upon the degree of the malocclusion to be corrected. The arch wires then are bent back to their original ideal form and replaced in the mouth, and allowed to remain for another month. After the second or third application of force the original arch wires will show no deformation on removal, and then they are replaced by 0.018 inch round wire arches, also bent to the ideal form. The size of the arch wire is increased each succeeding month by 0.002 inch until 0.022 inch in diameter is reached, and that is followed by the 0.022 inch × 0.028 inch rectangular arch, applied edgewise. This is the final arch to be used and is of a precious alloy to permit the soldering of intermaxillary hooks, staples, et cetera. Here it must be noted that the greatest force delivered to the teeth is after the first application of the metal arches. When the original arch wire

is replaced in the mouth the second time, the forces cannot be as great as at the first time, because the arch wire has exactly the same form as it had originally and the teeth have already moved during the previous month. When the heavier gauge wires are inserted, the teeth are already lined up, and they are needed only to complete the expansion of the posterior regions, which the light gauge wires cannot accomplish. It is my belief that by following this method the patient is subjected to the gentlest treatment, and since the tooth movements cease a few days after the application of force, each movement is followed by a long period of rest, which is beneficial.

INDIVIDUAL TOOTH MOVEMENTS

Individual tooth movements can be brought about with great facility by the new modified edgewise arch mechanism, without further changes in the form of the arch wire. In this respect the mechanism differs from any other appliance in use at the present time. Secondary bends, such as picket fencing or torqueing of the arch wire, are not necessary, and at the same time the

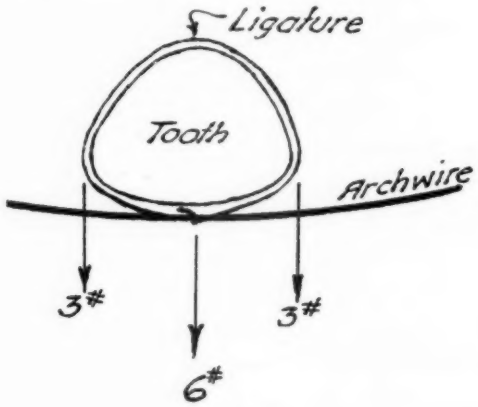


Fig. 18.

freedom of the teeth in relation to the arch wire is maintained at the maximum throughout the treatment. This is an extremely important point in favor of the appliance, for the freedom of the teeth is nearly the same as with the use of the plain labial arch, which is believed to be the gentlest in action. As a matter of fact, the ligatures used in conjunction with the plain labial arch may stress the alveolar bone more intensely than the light gauge wires employed in this new technique.

Since the stainless steel of which the ligatures are made has an ultimate strength of at least 60,000 pounds per square inch, even if 0.008 diameter wire is used, the tension in the wire may reach three pounds before breaking. This means that the labial pull on the tooth can be as high as six pounds (Fig. 18), and if heavier ligatures are used, even higher. This is the amount of force the alveolar bone must resist at the moment the ligature is applied, but fortunately as tooth movement begins to take place the force is rapidly diminished. With the modified edgewise arch mechanism such great pressures cannot be brought upon the teeth, even for a short time; yet the application of force is more definite and the ligatures are more secure.

The required freedom of a tooth in relation to an appliance is governed by the natural freedom of the tooth during function. Each tooth has a functional displacement, and it is not necessary to provide for a greater freedom of the tooth in relation to the appliance than its natural displacement during function. The clearance provided in the brackets even for the heaviest arch wire (0.022 inch × 0.026 inch) allows full functional displacements, and when the lighter gauge wires are used the freedom of the teeth is more than necessary. All this is to point out that the teeth are not rigidly fixed to the arch wire as is the case in all other banded appliances, and that we may bring about any desired tooth movement with the greatest ease.

An individual tooth may require any of the following corrective movements:

1. Labial.
2. Lingual.
3. Occlusal (or elevation).
4. Gingival (or depression).
5. Mesial.
6. Distal.
7. Rotation (right or left).
8. Labial root movement.
9. Mesial root movement.
10. Distal root movement.

In the average complex case all these movements may become necessary. It must be pointed out, however, that these tooth movements do not represent pure tipping movements or root movements. The change in the position of the teeth during orthodontic treatment is almost always a combination of tipping and bodily movements, and it is always expected that the teeth when moved into normal occlusion will be in the proper position. In some instances additional rotation and labial, mesial, or distal root tipping may be desired. This is readily seen when it is considered that even the exclusive users of the plain labial arch, who otherwise disregard bodily tooth movements, make occasional provisions for root movements.

The new bracket provides for all these tooth movements. The labial, lingual, occlusal, and gingival movements are automatically performed by the arch wire during the first two or three months of treatment. Mesial or distal movements seldom are necessary after symmetry has been established, which is always the first step in treatment; but occasionally a space may be opened for a tooth by the use of a small helical spring over the arch wire, applied between adjoining brackets. Rotation is provided for on every tooth by soldering a small staple on to the lingual surface of the band, whether the tooth needs rotation or not.

The movement of rotation is effected by bringing the ligature through the staple, and carrying both ends through the interproximal space on the side toward which rotation is desired, and tying them to the arch wire. Labial root movement is accomplished by means of occlusally directed finger extensions from the arch wire pressing on the labial surface of the tooth near the incisal edge. Mesial root movement is brought about by ligating two staples

on the labial or buccal surface of the band to the arch wire. The mesial staple is located gingivally to the arch wire while the distal staple is occlusally situated. This is a very effective means of bringing about mesial root movement, and the rotating influence is measured by the product of the tension in the ligatures and the distance between them. The farther apart the staples are placed on the tooth, the more effective will be the action of the couple thus formed. Distal root movement is brought about in a similar man-

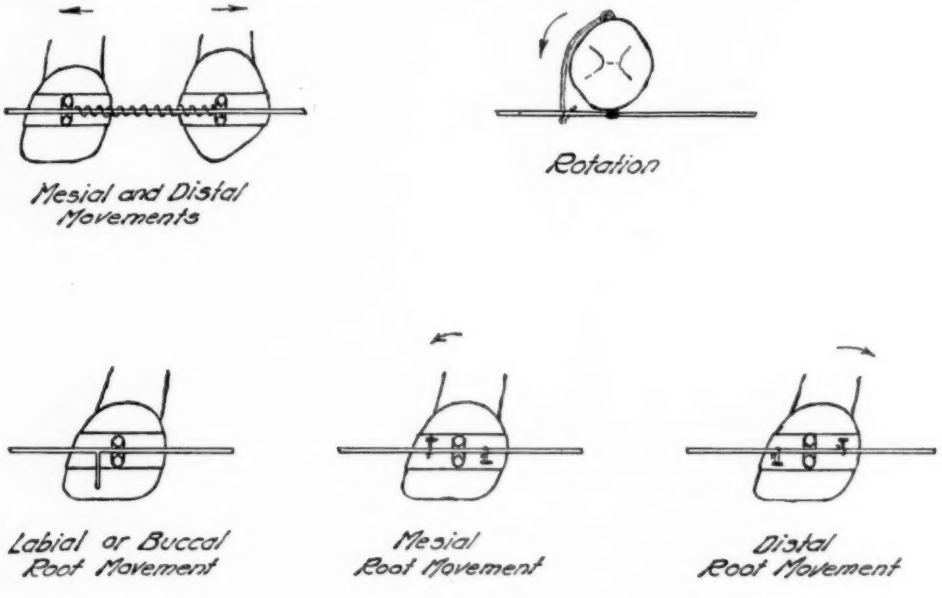


Fig. 19.

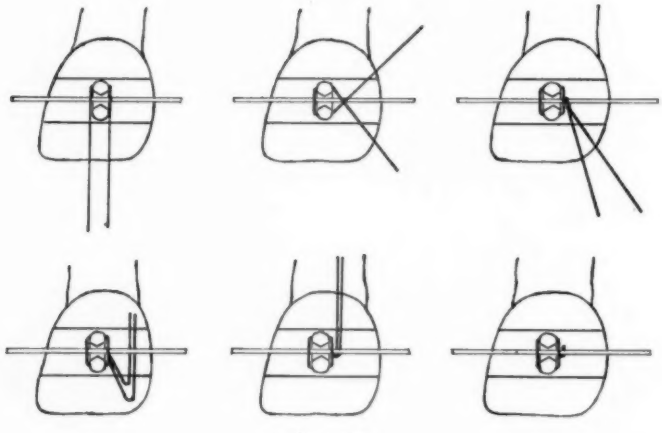


Fig. 20.

ner, with the position of the staples reversed, the mesial staple soldered on the band occlusal to the plane of the arch wire, while the distal staple is soldered on to the band gingivally. Inasmuch as the required tooth movements can be anticipated at the time the appliances are constructed, every tooth movement is provided for in advance. The movements of rotation and root movement are begun as soon as the teeth are in reasonable alignment, usually in the second or third month. The earlier this is begun, the better;

for the response to these movements is much more rapid if the arch wire is not too heavy. It is reasonably certain that after eight or nine visits the teeth are properly aligned, and the case is ready for the adjustment of the relationship between the mandibular and maxillary arches. It must be borne in mind that by this time all the required expansion has been obtained and that the use of the intermaxillary elastics will bring the mandible into the most comfortable position for the patient. In many instances the mandible assumes the proper position without the use of the intermaxillary elastics, but in any event their use should be limited to the shortest possible time. After the case is completed, the appliance is left in place for at least two months, and then the retaining appliances are constructed in the usual manner.

There are many small practical details which I cannot cover adequately in my allotted time, but with the use of the new appliance innumerable procedures present themselves as problems arise. Our experiences with other appliances will help us in accomplishing our aim, for the application of new ideas in the modified edgewise arch technique has no limitations. The results which can be obtained through the use of this mechanism equal the results obtained with the original edgewise arch appliance.

It still remains to describe the application of the ligatures for the purpose of locking the arch wire into the bracket. About a foot of 0.008 inch chrome alloy wire is cut off and doubled on itself at the midpoint of its length, forming a small open loop. The loop is applied over the gingival arm of the bracket, crossing the seated arch wire in front. Then the two ends are brought together on one side of the bracket and are firmly locked in a pigtail twist of about an eighth of an inch in length. The twist is in front of the arch wire. Then both ends of the ligature are brought behind the arch wire, and the twisted portion is made to encircle closely the arch wire. The ligature is cut off as close to the arch wire as possible, and by means of a suitable instrument tucked behind the arch wire in close contact with the bracket. The twisted portion forms a little ring around the arch wire which is so firm that it cannot be displaced by the vigorous use of the toothbrush or by mastication, and the ligature remains in position for a month or two without loosening. This method of applying ligatures is very satisfactory, and if the ends are cut sufficiently short, irritations of the lips and cheeks will never occur.

There are many advantages to be gained by the use of this appliance. The length of time of treatment is materially reduced, and because of the fewer visits required, the orthodontist's sphere of activity is extended to more distant communities. The operating time can be more efficiently utilized. When the appliances are constructed, the patient remains in the office two or three full days, or until the appliances are completed. This is preferable to short appointments, during which only two or four bands are made. The patient is more willing to have intensive work done than to visit the office ten or twelve times during the construction of the appliances. This does not impose a great hardship on the patient, for there is plenty of time for rest, reading, and study between the various operations. The schools cooperate more willingly and permission has been granted in every case to keep the child out of school for the required number of days. Nearly all patients

return for treatment once during the summer months, and summer retaining appliances are not necessary. This lightens the burden of the orthodontist before and after the summer vacations.

But the most important advantage is the feeling of security and accomplishment which attends every visit of the patient to the office. Tooth movements take place as they are expected, and we might even say according to schedule. Something tangible is accomplished at every visit with certainty and without injury to the tissues. In this appliance the virtues of the plain labial arch and the advantages of the Angle edgewise arch mechanism are incorporated, without any of their disadvantages. To those who still adhere to the use of the plain labial and lingual arch appliances, I should like to say that I have been using those appliances for nearly twenty years, and I have very carefully considered the advisability of adopting another method of treatment; I was among those who opposed the use of banded appliances, and I am still under the impression that banded appliances with rigid attachments have no place in my practice. To those who are already using banded appliances, I can only suggest a change from the rigid type of brackets to the newer type, which permits complete functional freedom of the teeth during treatment. With their use, they will discover that this new mechanism is not merely another appliance which will do the work just as well, but an appliance which is always under complete control and which will enable us to discharge our duties far better than any other mechanism given to us in the past.

REFERENCES

1. Angle, Edward H.: The Latest and Best in Orthodontic Mechanism, Dental Cosmos **70**: 1143, 1928.
2. Sved, Alexander: The Behavior of Arch Wires in Fixed Attachments, INTERNAT. J. ORTHO. **23**: 683, 1937.
3. Brumfield, R. C.: An Experimental Check on Edgewise Arch Computations, INTERNAT. J. ORTHO. **23**: 687, 1937.
4. Sved, Alexander: Growth of the Jaws and the Etiology of Malocclusion, INTERNAT. J. ORTHO. **21**: 1013, 1935; and **22**: 114, 1936.

654 MADISON AVENUE

LIMITATIONS

GEORGE M. ANDERSON, D.D.S., BALTIMORE, MD.

PROFESSOR RYLE of Cambridge, England, speaking[1] before the British Dental Association, made a significant statement when he said "much pertinent observation goes to waste." Dr. Harold Chapman commented on this: "There are many observations which orthodontists could make and if they only collected the evidence they could learn a great deal." These remarks are impressive because they are true. They are particularly appropriate to orthodontic diagnosis, where our failure to collect, correlate, analyze, and make available a great mass of data continues to inhibit the acquisition of a rational knowledge of the etiology of malocclusion of the teeth with empirical treatment thereof naturally resulting for many of our cases.

In actual practice our haste to accept a patient invariably limits the initial study of the problem to superficialities, so that when difficulties appear in the treatment or maintenance of the result we are not quite clear as to whether the difficulties existed prior to treatment, developed during it or after completion. This inadequacy of information is always emphasized when I refer a patient for continuation of treatment or when one is referred to me. Plaster casts and x-ray pictures usually constitute the transfer record, though on rare occasions we do send or receive photographs and a brief report on what was actually seen at the original examination with a line or two as to possible etiology. If you think about this at all, you know it to be true. As we reflect about it we realize that our perspective has been wrong, for while the mechanical, technical and artistic phases of our work have their important place, they should not have overshadowed diagnosis. Every now and then there is spasmodic evidence of aggressive effort to overcome this defect, yet I doubt if many in the profession will dispute the fact that interest in cause and effect (diagnosis) has been secondary in the consideration of many cases accepted for treatment. This has been an unfortunate situation; for, while we may be able to work wonders with appliances in "moving" teeth, those marvels do not always stay put, and a second try is often no better than the first.

The word "failure" therefore has crept into our literature. In reconsidering a number of such instances from my own practice and giving them the study they originally deserved, I have found evidence that gave new light to the malocclusion being reviewed. Certain cases which I had classified as failures possessed limitations which from the start of treatment acted as a barrier to success. In some I had failed to see or act properly; in others I could have done nothing or at least very little no matter how well I saw or acted.

Read before the New York Society of Orthodontists, March 7, 1938.

These limitations therefore may be divided into two groups:

1. Those of our own doing, errors of omission and commission. As example I cite the failure to note the ever-increasing evidence that distal movement of posterior teeth is required in many instances because of a previous mesial shifting.
2. Those that are beyond recognition or if recognized cannot be controlled or influenced. As examples, I cite hereditary influences and the prenatal position of the teeth as an influence in eruption of the deciduous denture.

It requires a reasonable degree of temerity for me to devote this report to that second group, but I have come more and more to respect it for I believe in it are to be found the "reasons" for many of our unsatisfactory results. Enough evidence is accumulating to prove beyond a reasonable doubt that situations exist which have an unfavorable prognosis, and discussion of

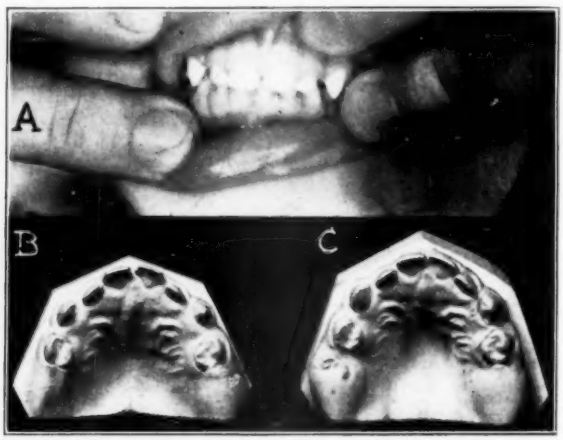


Fig. 1.—*A*, Photograph of patient at 2½ years of age (same age as at *C*). *B*, Cast of patient at 2 years; *C*, cast of patient at 2½ years.

treatment possibilities must be tempered with the sobering influence of these obscure yet dominating factors.

The few illustrations selected relate to but two cases. One, obviously because of the age of the patient (now 2½ years), has not had orthodontic treatment—the other has had the customary ten years.

I have watched with interest the positioning of the deciduous incisors as shown in Fig. 1. It does not appear to fit that perfect pattern we have been led to believe is ordained for the deciduous denture. For instance Logan[2] states: "The deciduous lateral incisor, shortly after birth, lies lingual from the deciduous central incisor and deciduous cuspid. The distance between the latter two teeth is less than one-half of the mesiodistal width of the deciduous lateral incisor. At the age of six months the deciduous central and cuspid have moved apart and the deciduous lateral has moved labially and stands almost in line with its neighbor. Finally at the age of nine months enough space has been created by the growth of the upper jaw to cause the

deciduous central, lateral and cuspid to stand in a *perfect* arch." In this instance that has not happened, and in the five months that elapsed between the two impressions there has been considerable development of the maxilla without any favorable alteration in position of the incisor teeth. Why? I believe we have to go back, prior to birth, and there we shall find the answer.

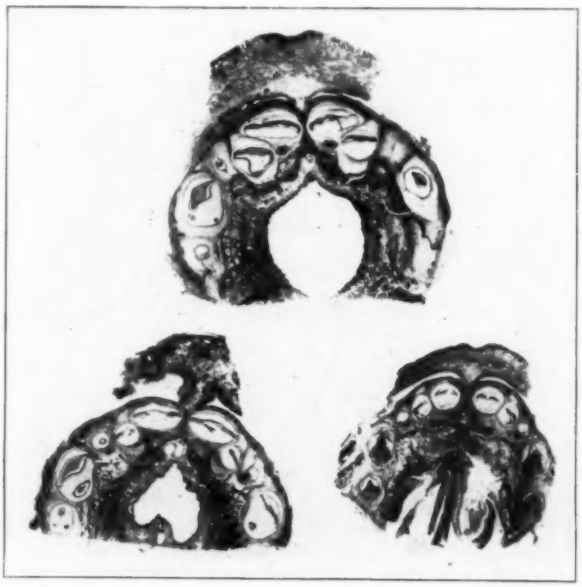


Fig. 2.—Each section is from a different fetal maxilla of about the same age. Note the varying position of the deciduous lateral incisors.

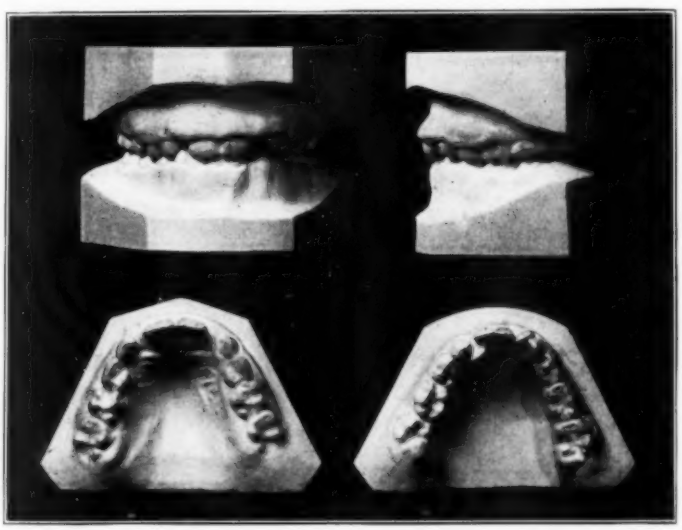


Fig. 3.—Patient aged 8 years, apparently presenting a more or less average orthodontic problem.

Some months ago Dr. Aisenberg and I studied a number of fetal maxillae ranging in age from four to nine months. We did this for the frenum, which has no part in this discussion, but the same serial sections gave us some very interesting data on the position of the deciduous incisor teeth. Fig. 2 shows sections of three of these fetal maxillae of approximately the same age, five to

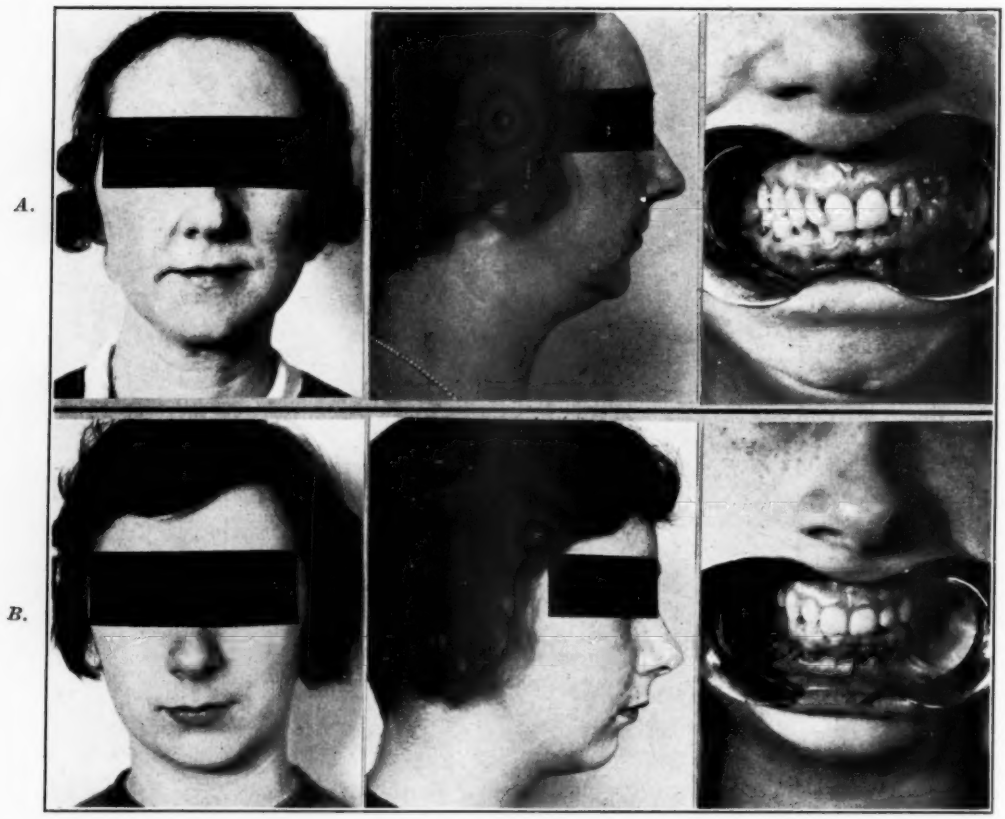


Fig. 4.—*A*, Mother of patient shown in *B*. Note similarity. *B*, Same patient as shown in Fig. 3.

A. *B.*

Fig. 5.—*A*, Profile of patient at time impressions were made for models shown in Fig. 3. *B*, Patient four years later.

six months. Note the varying position of the lateral incisors. In this early stage of life we note that the teeth assume positions at variance with the ideal pattern we hope later to see. The size of the teeth in the very small maxillae may have had a great deal to do with their position, and while if the child had lived and the maxillae grew the teeth might have an opportunity to unravel, it is perfectly obvious that in one instance there is far more to unravel than in the others. In fact it is a rather circuitous route ever to make a perfect alignment and yet another, as you see, has even alignment of the incisors prior to birth regardless of the change Logan cites which occurs during eruption. I think therefore that I see why the 2½-year-old boy has his lateral incisors in the position shown in the two plaster casts (Fig. 1), and accept this situation as giving evidence of prenatal difficulties in tooth alignment and consider it a warning of developmental problems which if ignored will serve as a limitation to success in corrective treatment when age permits and circumstances warrant.

A. *B.*

Fig. 6.—*A*, Radiograph of mandible made same time as models shown in Fig. 3 and profile shown in Fig. 5*A*. *B*, Radiograph made at same time as photograph shown in Fig. 4*B*.

Fig. 3 illustrates the dental arches of a girl aged 8 years, and the teeth appear to be similar to those of many other patients we are called upon to treat. Fig. 4, however, gives evidence of hereditary influence in the size of the mandible and represents a problem to which I have never given the thought it deserves. So many cases of what appeared to be deficient mandibles have been restored to satisfactory form that it is more or less taken for granted that most of them can be. This is one which did not measure up, and the earliest photograph (Fig. 5*A*) appears to have contained sufficient evidence to have been a warning signal as to what the result might be. The first few years of treatment, however, gave a reasonably satisfactory response. Fig. 5*B* shows the child after four years of treatment when I was fairly well pleased with the degree of improvement. There it seems to have stopped, and the radiograph taken at the time (Fig. 6*B*) gives evidence of a deficiency of area for the molars to erupt, but treatment was continued without realizing that a limitation existed which no appliance could overcome, and today while I may

feel fairly well satisfied with the position of the teeth, the deficiency in the mandible of the parent is evident in the child, and in the beginning it was distinctly understood by the parent and by me that development of the mandible was as desirable as proper placement of the teeth.

These limitations must not keep us from trying; they should spur us on to give whatever help we can to each individual patient, and, as in the past, a majority of our work will be a satisfaction to us but underneath all of it should be the thought that not infrequently we shall be called upon to aid a child whose problem is one which cannot be solved with a superficial diagnosis or cannot be totally overcome with the best of our mechanical aids.

REFERENCES

Chapman: Dental Rec. **58**: 70, 1938.
J. A. D. A. **22**: 29, 1935.

831 Park Avenue

PROBLEMS IN AN ORTHODONTIC OFFICE

PAUL J. MCKENNA, D.M.D., SPRINGFIELD, MASS.

IT MAY be observed that the world in these last few years, in search of someone to blame for its troubles, has chosen among other scapegoats, the medical and dental professions both in this country and abroad; with the result that the medical and dental professions have been the target not only for every little writer in magazine and press, but even for those within their own ranks. And so, fitting as it is at this year-end stock taking time, let us reflect—possibly back a decade or two—and then look forward, say, twenty years into the future. Our omissions and commissions are many—in fact too many to tabulate in detail—but I should like to consider a few which I consider outstanding.

We all know the unpretentious mechanical beginnings of orthodontics, and we are not ashamed of it. I am of the opinion (and few will differ with it) that the initial impulse for worldwide recognition and for the subsequent progress of orthodontics was due to the mechanical devices and to the men who invented them. I pay my due respect to both, because I am convinced that the advances of today would be impossible without them. Spectacular advances too have been the reward of workers in quest of scientific improvements and the dispatch of treatment during the last two or three decades. As a result orthodontics has established itself on a high plane of endeavor, creating another problem not so simple of solution as the methodical step-by-step advance in technique which has occurred in the past.

Rapid change is taking place in the economic and social life of America, and it is now no longer doubted that all the specialties of medicine and dentistry must meet the health requirements of the new social order. This concept means that in the future health services are to be made available for all the people, as education has been made available to the children of all the people, and the utmost effort must be bent toward making all dental services available to all who need them. How and where, is naturally the first question of the profession.

Our own office is "the place" in my opinion, "the time" some of our present unprofitable hours; "the girl" a worthwhile, needy patient. It must be considered in our business. We must be standard bearers of practical idealism. With uncertainties ahead, immediate gain must be sacrificed for long-range good. Enlightened business realizes that its affairs are often of real public interest. Today professional business must function with more than astuteness, experience, brains, technical efficiency, and untiring aggressiveness. It must carry the added responsibility of economic purpose and social consciousness. Above all, to serve well we should have in every one of our offices this philosophy of leadership, this consciousness of interdependence of everyone; and I might stress, as business management is stressing, the utter necessity of seeing, for the purpose of self-

Read before the Semi-Annual Meeting of the Harvard Society of Orthodontists, Boston, January 12, 1938.

protection, that each link in the practice of the profession—dentist, patient, office, or acquisition of knowledge—be kept strong so that the whole chain may safely hold together.

The measure of successful achievement attained in any profession is in direct ratio to the quality of service rendered and to the degree in which the service is made available to the public. Statistically, 95 per cent of our population earn only a modest income; 80 per cent of all children in the United States have major or minor defects of occlusion, and yet only 2 per cent receive orthodontic treatment. In considering the solution we must be mindful that the quality of our service must be maintained and that while adequate compensation must be had by the orthodontist for his services they must be rendered at a fee which is within reach of a far greater number of patients.

Many socialistic theories have been advanced, but are as impractical as many other theories are in the actual practice of orthodontics. Does it not seem most logical and practical that this could be accomplished by the efficient expansion of our own existing facilities? First, let us develop our own technical skill to higher efficiency. This is the master key! It is the greatest increment of profit in our office. Our skill indicates the efficiency, the speed, and the exacting detailed perfection of our whole establishment. Every year should bring a saving of our time by higher development of our own skill. Let us be sincere and examine our consciences on this point. It brings results. Intellectual vision is a solitary inspiration to recovery.

Let us become more of an executive by delegating our responsibilities, thus allowing ourselves the opportunity of enlarging our own sphere of usefulness. For the capability of an executive is indicated by his ability to delegate his work to people who can do the work for him better than he can do it himself. In this manner he conserves his time for his own perfection and for the spread of his professional work among the multitude. This means, of course, that our assistants must be capable and particularly trained.

First, a highly efficient secretary is necessary. She should care for all details of business, office routine, including correspondence, record keeping, appointments, telephone, reception and dismissal of patients, credits and collections, banking and purchasing of supplies.

Next of importance is a capable young woman who is a registered dental hygienist. In my experience I have observed that these young women are more satisfactory than a man laboratory technician. For if efficient she is just as capable in laboratory procedure and, in addition, can assist in the duties as either the chair or the secretary. In time of illness or vacations this feature is very valuable. There is no place in the modern orthodontic office for the disinterested, magazine reading, telephone gossiping assistant. Rather must we have assistants who possess pleasing personalities combined with a high degree of personal efficiency; for the efficiency of our personnel reflects the ratio of our own efficiency. Remember always that the thing of greatest tangible and potential value which the orthodontist can give is the total of his accumulated knowledge, skill, and experience. How can he give this unless he has an efficient organization?

Next, acquire facilities for efficient production, but never become over-facilitated; remember that a businessman is always making money when he is wondering how he will be able to get his orders out with his existing capacity for production. On the other hand, we must retain the pioneering spirit to discover improved ways of doing things and the courage to junk the obsolete. Greater simplification of treatment along lines of modern biologic concept will also enable the orthodontist to care conscientiously for a larger number of patients. All these points should speed up production and help greatly to solve our major problems.

Closely related to this solution is the "mail order" diagnosis and treatment in the hands of inexperienced men. This method doubtless satisfies a voracious appetite for treatment on the part of the dental profession, in spite of its unfairness to the public. The opposing propaganda to this mail order business has only sharpened the edge of the problem for more extensive treatment by the orthodontist. Let us relieve this problem by becoming more efficient in our office.

The efficient management of our own practice is possible only when we are in possession of detailed information regarding all phases of our work. This necessitates the use of an accurate system of record keeping and cost accounting. Do you know exactly what your overhead is? Do you know the actual cost of producing a completed case? Do you know your capital investment? What is the ratio of your overhead expense to cash receipts? Do you know how much of your time is productive and how much is nonproductive? A simple card will tell you this at a glance. Another card, possibly of another color, could be used for case analysis with definite decisions recorded and treatment recorded. An account record too is important. What are your credit losses, and how can you reduce them? Remember, always, that collection difficulties are largely our own fault. Possibly it is because of lack of a definite understanding in advance in regard to payments or maybe to lack of a definite systematic method of "follow-up" of delinquent accounts. Use the simplest of terms in making your contract or agreement with patients, for the complete confidence of patients is invaluable and must be cultivated and retained to stabilize and spread the good faith of orthodontics. In speaking of this, may I mention the personal thought of patients, such as birthday and Christmas cards. These little tokens stimulate and solidify the patient's confidence to the nth degree.

An analysis of our completed cases, properly recorded, provides a most illuminating knowledge of the variation in cases. This information is of real value in the handling of future cases and consistently utilized over a period of years should result in a much more intelligent approach to the many and varied problems of treatment. It speeds production, in other words. This system of record keeping takes the guess out of business and gives us a definite idea of a consistent, reasonable fee which should reach a much greater proportion than 2 per cent and yet allow the orthodontist to be adequately compensated for his services.

It is up to professional leadership to assume the responsibility, not alone of conducting business profitably and efficiently, but also of discovering and establishing a workable program of economic and social betterment.

Results will come more quickly and more surely if orthodontics is sympathetically understood and strongly supported by all who profit from our efforts. Extensive educational publicity among both the dental profession and the laity regarding the beneficial results which may be accomplished through the early recognition of the need of orthodontic treatment would solve many problems. It is one of our greatest missions as orthodontists and should be propounded at every opportunity.

No one field is self-sufficient, and this specialized service of ours will fall short if we fail to pay the strictest attention to our relations with other specialists and particularly with the general dentist; 30 or 40 per cent of those needing orthodontic treatment are going without it because of this malrelation. A concentrated educational program on our part would seem to be the most effective way of benefiting this cause, as well as ourselves. In this program let us not forget to solicit our patients and the general public.

It is astounding to note the number of people who are in utter ignorance of our profession and what it does for humanity. They do not even know what orthodontics means. Who is to be our missionary? We must do it ourselves! It calls for hard work, of tireless character, and a tremendous amount of effort and time; but, looking forward, I am sure that our rewards will be great.

If each of us does his part in this direction, the cumulative result will help to dissolve those obstacles we see looming ahead and will bring into sharper relief some of the many definite opportunities of tomorrow.

69 Chestnut Street

CLOSING OF THE SPACE OF A LOST MAXILLARY CENTRAL INCISOR

JOHN W. ROSS, D.D.S., PHILADELPHIA, PA.

A PROBLEM frequently encountered by the orthodontist is that in which a child's maxillary incisor is knocked out by a blow or by impact against a fixed object.

I am surprised, in reading the literature, at the scant aid offered in methods of treating problems of practice frequently encountered. There is an abundance of discussions of principles but a marked lack of articles on actual handling of individual cases.

I have prepared this case report with that thought in mind. I shall present the problems involved in this individual case and shall present the advantages and disadvantages of the different modes of procedure which are possible. My reasons for proceeding as I did and the results obtained will be explained. The case selected is typical rather than unusual.

Fig. 1 shows the case of a girl whose maxillary right central incisor had been completely knocked out when she hit a wall while riding her scooter. The other central incisor and the other teeth were not affected by the blow. I first saw the case in 1929 when the child was eight years of age.

Two methods of procedure were possible in this case. Both presented advantages and disadvantages. I shall try to make clear the way in which I weighed the problem and my reasons for proceeding as I did.

One procedure in such cases is the maintaining of the space left by the tooth which had been knocked out. Orthodontic treatment would be instituted for the correction of other malocclusion. By soldering a facing to a lingual arch, purely for the sake of appearance, or by the placing of a skeleton plate carrying an artificial incisor, the space would be maintained until the sixteenth or eighteenth year. At that time the prosthodontist would make the necessary replacement of the tooth with one of the correct size and color. There are definite advantages in this method. The correct occlusal relations of the teeth are preserved, and it is possible to place a central tooth of normal size, thus maintaining a completely balanced denture.

In this particular case, however, to me this advantage did not outweigh the disadvantages; chief of which is the mutilating of tooth material in adjacent teeth which is necessary in making a replacement of a single incisor by a bridge, or the gingival irritation and eventual degeneration which result from the insertion of a plate. Such replacements must be changed at intervals throughout life if the changing color of the natural teeth is not to make the artificial substitute very apparent. Eventually the adjacent teeth may be lost.

Read before the New York Society of Orthodontists, New York, N. Y., Nov. 15, 1937.

The prosthodontist tells us that the most difficult problem he encounters is the replacing of one tooth. He considers the mandibular incisor most difficult and the maxillary incisor next in line. Of course, the later in life such replacements can be made the more satisfactory they prove to be.

The other method is the closing of the space left by the lost tooth. This is accomplished by moving the next tooth into the position of the one lost. All the other teeth on that side are moved forward the space of one tooth. Thus the space is eliminated entirely, and the patient has nothing but natural teeth in her mouth. There is no mutilation of the natural teeth because no artificial

Fig. 1.

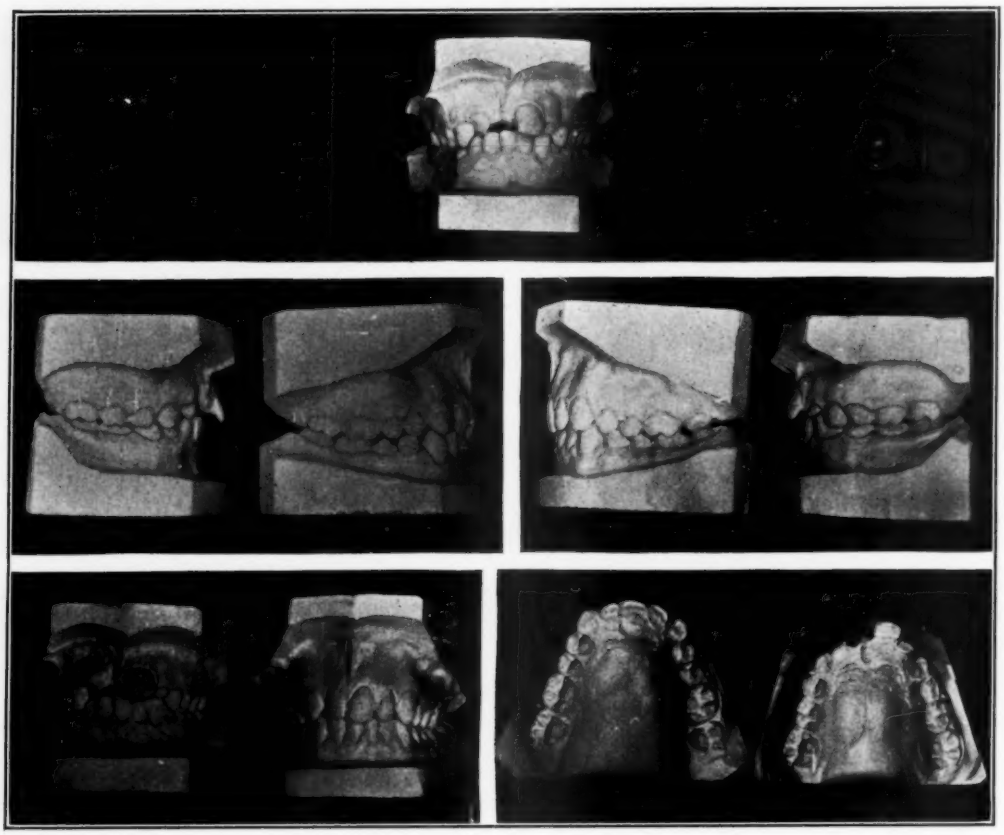


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5

teeth are needed. Another advantage is that the work can be completed earlier in the life cycle of the child, and there is no need for visits to the prosthodontist throughout life for the replacing of the artificial central incisor, as in the other mode of procedure.

To be sure, there are disadvantages. In moving the teeth forward on the side in which the tooth was lost, we create, in effect, a distal relationship of the mandibular to the maxillary teeth. Then, too, there is a disharmony in the appearance of the denture, but this disharmony in tooth material and size is far more apparent to the orthodontist than to the laity.

The orthodontic treatment required in closing the space requires much more judgment and skill than in maintaining the space, but I believe the result makes it well worth while.

I have closed spaces in a large number of similar cases, and the results have proved most satisfactory. I believe that the advantage of not wearing an artificial denture is greater than the disadvantage of the disharmony in appearance. Therefore, in this particular case it was decided to close the space with the natural teeth.

Fig. 2 shows the right side of the case before and after treatment. Note the position of the molars before treatment was started and the position of the molars after treatment was completed, and the maxillary teeth were moved forward.

These models were taken five or six years ago. Although I saw the patient last summer, no further models were made, but the teeth had settled together and were absolutely in contact.

Fig. 3 shows the left side of the case before and after treatment.

The remaining central incisor has deviated from the median line, and this has given the distal relationship on the left side. In the mouth, the disharmony shows much less than in the slides.

In some cases the lateral incisor which replaces the lost central incisor is fitted with a jacket crown in order to give it the appearance of another central incisor. This gives a very pleasing effect especially if the adjacent canine tooth is ground to make it appear more like a lateral incisor.

In this particular case, however, the lateral incisor was quite large, and the dentist felt the result so satisfactory that he thought the placing of a central jacket crown both unwise and unnecessary.

Fig. 5 shows the occlusal view of the case before and after treatment. I should like to call especial attention to the arch form after treatment. Note the regularity of the arch form although one central incisor is missing in the alignment of the teeth.

I believe that this patient has been better served by the closing of the space than she would have been by the supplying of an artificial substitute. I have followed this procedure in many similar cases with results which were very gratifying. I am so well satisfied with this procedure that at the present time whenever it is possible in such cases I advocate closing the space because I believe that this procedure best serves the patient throughout life.

1520 Spruce Street

COMPROMISE TREATMENT IN A DISTOCLUSION CASE

Giving Further Data and Progress on Case Reported November, 1935

Norman L. Hillyer, D.D.S., New York, N. Y.

TWO years ago I reported a case which was somewhat radical in its treatment. During the discussion which followed this case report several members asked that the case be reported further, with a view to finding out whether the result obtained, or partially obtained, held in position, improved, or returned toward the malocclusion with which we started. It might be well, perhaps, to present a short synopsis of the case.

History.—The patient, C. S., came to me for treatment September 12, 1930. His history was as follows: Male, aged 12 years and 5 months; good hearing, vision and mental development; weight 82 pounds, height 5 feet 3 inches, oral health good with fillings in all four first permanent molars. No other caries or fillings. Birth was normal, weight at that time being 8 pounds. Breast fed for six weeks then bottle fed to eighteen months. Severe malnutrition until about one year. (This last statement seems to me important.) Father of English descent and mother of German; both had irregular arch form, as had only sister. None was treated for malocclusion. Patient had "only mild forms of the usual children's diseases" according to the mother. Adenoids and tonsils in good health as reported by physician. No brothers and only one sister. Thumb-sucking habit only partially broken at that time.

Etiology.—It seems that, in this case, the anterior alveoli supporting the incisors were misplaced by the action and pressure of the thumb in the persistent habit of sucking. The bony structures were, perhaps, badly developed due to the early history of malnutrition, although this is not apparent at this date in other parts of the body.

At the time this case was again reviewed and more data were taken for this second report, the boy was nineteen years old, weighed over 180 pounds, was 6 feet 2 inches in height, and played football at his school; so his development had carried on, I think, in the same way that it had started, and malnutrition was not evident, at least in the skeletal growth.

Diagnosis.—

Angle:

Class II Division 1.

Lischer:

Distoclusion with protruding maxillary incisors.

Read before the New York Society of Orthodontists, Nov. 16, 1937.

Simon:

A. Bimaxillary, alveolar, anterior contraction, mild and symmetrical.
B. Maxillary, total protraction severe and symmetrical.
C. Maxillary, alveolar, anterior attraction, severe.

Fig. 1.

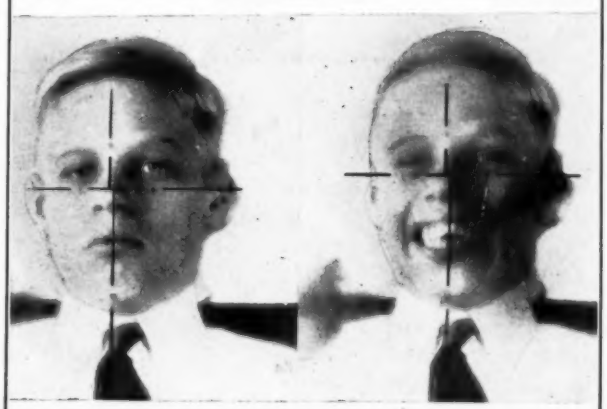


Fig. 2.

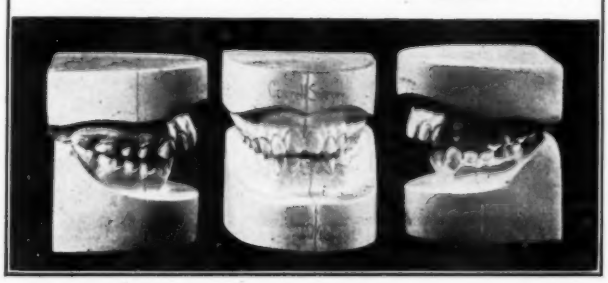


Fig. 3.

Treatment.—It was decided that general procedure should be set aside because of the severity of the dental anomaly and its effect upon the profile. It seemed impossible to treat in any other way than by radical treatment, which consisted of the removal of two sound, healthy first bicuspids in the maxillary arch.

Figs. 1-3 show the case in the beginning. The first bicuspids were removed and the maxillary cuspids carried back, first by a labial arch wire with attachments, of course, to prevent rotation of the canine teeth as they came

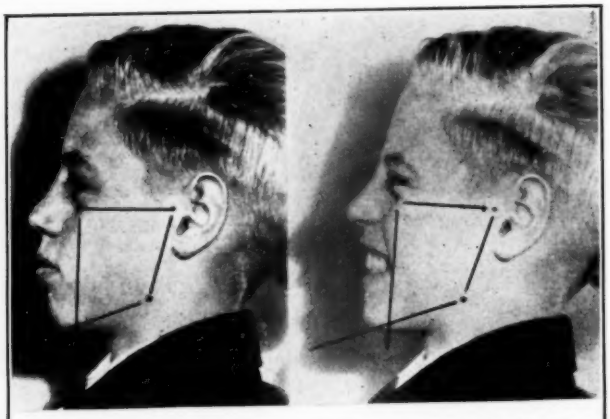


Fig. 4.

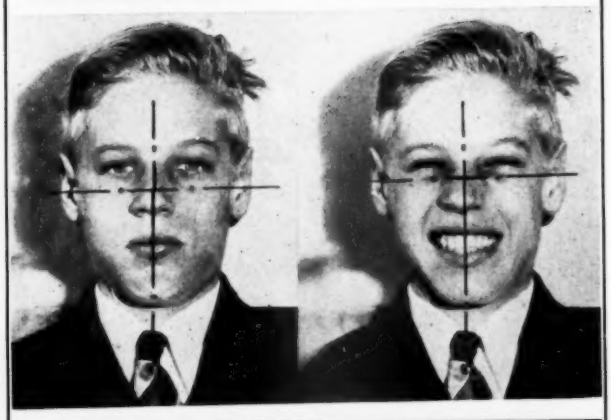


Fig. 5.

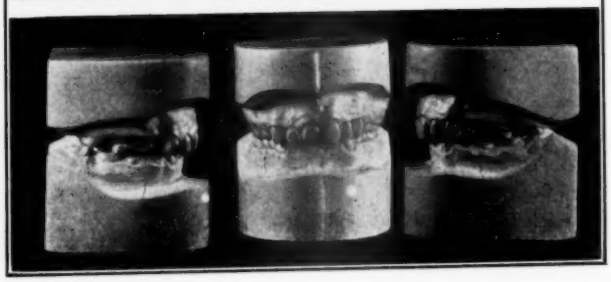


Fig. 6.

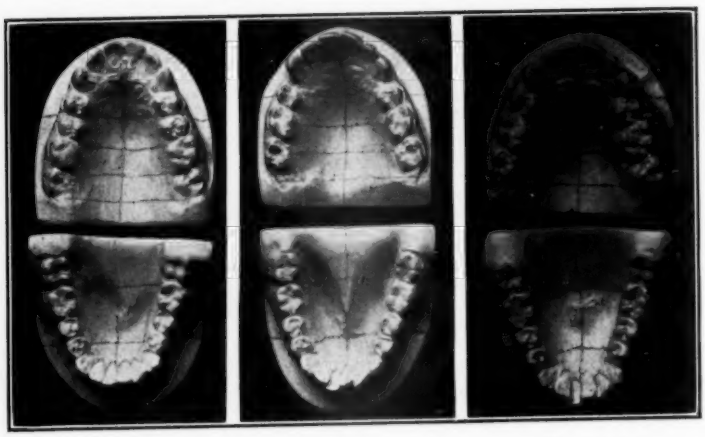


Fig. 7. Fig. 8. Fig. 9.

back. The spaces were decreased and, with those spaces closed, or very nearly closed, Angle bracket bands were put on the four maxillary incisors, and a round arch wire and heavy silk intramaxillary ligatures were used to retract those teeth.

Fig. 1 shows the severe protraction, or maxillary mesial drift, evidenced in the models as well (Fig. 3).

Photographs, full face, at the beginning of the case are shown in Fig. 2.

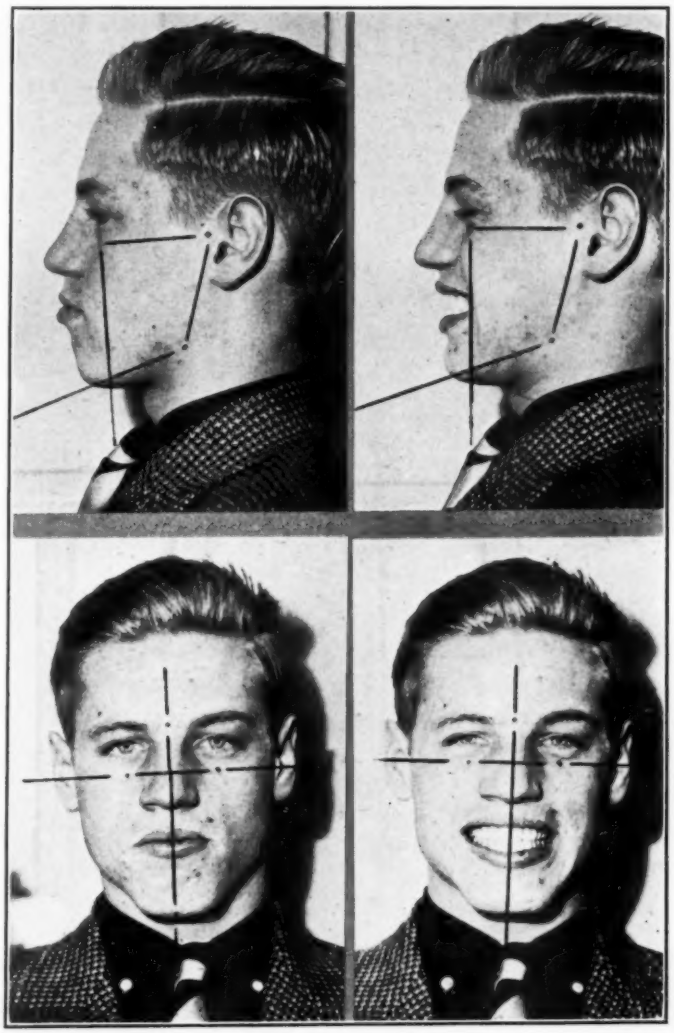


Fig. 10.

Fig. 11.

The case as reported in November, 1935, shows, I think, quite an improvement, but there are difficulties which probably prompted the members to ask for a further report on it. The difficulties are obvious (Fig. 6), being the spacing between the maxillary cuspids and the bicuspids (it is not evidenced in this, but later on it will be shown) and the crowding of the mandibular anterior teeth.

Fig. 4 shows the profile, which obviously has improved.

Fig. 5 shows a full face photograph at the end of that treatment.

The occlusal view of the models at the beginning of the treatment, before the two bicuspids were removed is shown in Fig. 7. Note that the mandibular anterior teeth show little irregularity. It was decided, incidentally, to leave the so-called distoclusion present, merely moving the incisors back and leaving the posterior occlusion in a distal position. No treatment at all was to be instituted in the mandibular arch.

Fig. 8 shows the condition at the end of that first treatment. Note the spacing between the maxillary cuspid and the bicuspid on both sides, and the crowding of the mandibular anterior teeth. This had been under treatment since October 24, 1930. It had been observed until finally the Hawley retainer used at the very end of the treatment was removed in June, 1932. This model was taken in December, 1932, for the first report, and the ones you will see following this were taken in December, 1936, four years later. That is, there had been no appliance on the case for four years and a half between the removal of the retainer and the final pictures.

An occlusal view of the case as it appeared in December, 1936, with no further treatment at all, is shown in Fig. 9. The space had closed on the left side completely, and on the right side very nearly so. The mandibular anterior teeth were perhaps more crowded, but in the profile, with the exception of a prominent lower lip, there is no showing of the mandibular anterior teeth; and, esthetically, it is not a bad appearance.

The profile as it appears now is shown in Fig. 10. The prominent lower lip may be due to the mandibular anterior teeth, and it may be due to football and his seemingly pugnacious attitude at the moment.

Fig. 11 shows the full face views.

I feel satisfied that the treatment has been successful in that most of the difficulties which appeared at the time the partial report was made have cleared up, and I think that the boy has been benefited a great deal esthetically and in the function of mastication.

1 East 57th Street

PALATOMETER

H. Jobe Sedwick, D.D.S., and Robert E. Brawley, D.D.S., Rochester, N. Y.

IN 1934 in connection with the study of oral diseases in children, observations and measurements of the hard palate were started. This investigation required the services of an instrument which would measure in three dimensions. A search of the literature for such an instrument showed that various

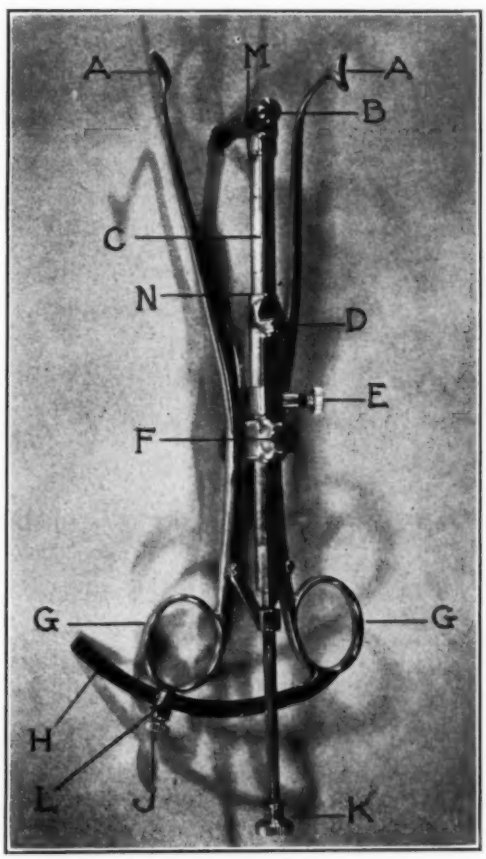


Fig. 1.—Palatometer: *A*, adjustable curved arms; *B*, adjustable vertical millimeter bar; *C*, movable horizontal millimeter bar; *D*, concave sliding shoulder; *E*, shoulder handle and set screw; *F*, set screw for adjusting mechanism of instrument; *G*, adjustable handles; *H*, crescent millimeter bar; *J*, set screw; *K*, movable knob for adjustment of *B*; *L*, *M*, *N*, indicators.

investigators as Alkan, Buser, Case, Channing and Wissler, Denzer, Gaston, Peyton, Stanton, Talbot, and others, in measuring the palate from casts and on living subjects, had used various types of instruments, ranging from simple calipers to the more complex dental surveying apparatus. Among these

From the Department of Pediatrics, School of Medicine and Dentistry, University of Rochester.

Presented at the meeting of the International Association for Dental Research, Baltimore, Maryland, March 13, 14, 1937.

This work is being conducted under a grant from the Beech-Nut Packing Company.

Talbot had devised an instrument which appeared to be very satisfactory for its purpose, the measurement of width and height. In order to measure the third dimension, however, Talbot's instrument was modified so that the length of the palate might be measured, as well as the width and height. This instrument was named "palatometer." A description of the palatometer and its use is as follows: *H*, *B*, and *C* are graduated in millimeters. *B* moves up and down by means of small gears operated by turning *K*. *B* also moves posteriorly or anteriorly by the movement of *K* in a similar direction. *D* slides on *C* by using *E* as a guide. *F* adjusts the mechanism of the instrument. In making all measurements with the palatometer the maxillary central incisors rest against the concave shoulder *D*.

To Measure Width.—By manipulating *G*, the curved arms *A* are adjusted to the gum line of the lingual surface of the teeth at which the width of the palate is to be taken. This position is held by the set screw *J*. The width is registered by the movable indicator *L* which slides on *H*.

To Measure Height.—By turning *K* the vertical rod *B* is adjusted to the height of the palate, which is registered by the indicator *M*.

To Measure Length.—By sliding *K* backward, *B* is adjusted to the posterior margin of the palate. This position is maintained by the set screw *E*. The length is registered on *C* by the indicator *N*.

Measurements resulting from the use of the palatometer are in progress and will be reported at a future date.

REFERENCES

Alkan, L.: Gewisse Formen des harten Gaumens und ihre Entstehung, Arch. f. Laryng. u. Rhin. **10**: 441, 1900.

Buser, E.: Sind der hohe Gaum, Schmalheit und V-formige Knickung des Zahnbogens, sowie Anomalien der Zahnstellung eine Folge der Mundatmung und der Wangendrucke? Arch. f. Laryng. u. Rhin. **15**: 503, 1904.

Case, Irene: Correlation Between Mental Defects and Anomalies of the Hard Palate, Am. J. Insan. **75**: 501, 1919.

Channing, Walter, and Wissler, Clark: Comparative Measurements of the Hard Palate, Am. J. Insan. **61**: 687, 1904.

Denzer, B. S.: The Size of the Infantile Palate, Am. J. Dis. Child. **22**: 471, 1921.

Gaston, Robert W.: Method of Measuring the Relative Height of the Palate, INT. J. ORTHO. **5**: 172, 1919.

Peyton, Wm. T.: The Dimensions and Growth of the Palate in the Normal Infant and in the Infant With Gross Maldevelopment of the Upper Lip and Palate, Arch. Surg. **22**: 704, 1931.

Stanton, F. L., Fish, G. D., Ashley-Montague, M. F.: Description of Three Instruments for Use in Orthodontic and Cephalometric Investigations, With Some Remarks on Map Construction, J. D. Res. **11**: 885, 1931.

Talbot, Eugene S.: A Study of the Degeneracy of the Jaws of the Human Race, Dent. Cosmos **34**: 253, 337, 421, 512, 589, 1892.

Department of Oral Surgery and Pathology

Edited by

STERLING V. MEAD AND KURT H. THOMA

Articles on oral surgery, radiography, and anesthesia should be submitted to Dr. Sterling V. Mead, 1149 Sixteenth Street Northwest, Washington, D. C. Articles on oral pathology should be submitted to Dr. Kurt H. Thoma, 47 Bay State Road, Boston, Mass.

FACTORS INFLUENCING CHOICE OF ANESTHESIA AND HOSPITALIZATION

WILSON R. CONRAN, D.D.S., HARTFORD, CONN.

TWO subjects, especially, I wish to emphasize in this paper, and both of them are likely to be ignored by the general run of us in our practice. Yet, ignored as they too frequently are, both are of considerable importance. They may vastly affect our professional prestige, particularly among other professional men; they may mean a great deal in our attempt to advance our own profession along the best lines which science opens to us; and their consideration will frequently lead to greater satisfaction on the part of our patients.

The two subjects to which I refer are (1) the frequent advisability of hospitalizing patients, and (2) the importance of the proper choice of anesthetic. I am not particularly concerned with surgical technique but with these two phases of it which are frequently relegated to a place of minor importance.

The majority of our operating cases involving one or even a number of teeth, can certainly be performed with success and satisfaction in the dental office. But, though it is not a proposition generally admitted by practitioners, I make bold to assert that many multiple extractions, complicated single extractions which require time and considerable coaxing with chisels and elevators, deep impactions, cysts and growths of the mouth, should be treated in the hospital. This is especially true in the case of aged persons. It is risky to attempt a really strenuous operative procedure on the aged and the feeble; and certainly, if we decide to operate at all, the hospital, where all the facilities for careful postoperative procedure are available, would seem to be the place for it.

Likewise, general extractions can and should take place in the hospital. Dentists are themselves at fault if they underestimate the seriousness of such an operation. If they get away with it in their office, they are lucky; and we cannot blame overmuch the medical brethren who criticize this practice and look askance and say, "Well, he is a dentist; what more could you expect?" Their remark expresses a legitimate criticism, and it is damaging to our professional prestige to give them the chance to make it. The physician would not begin to take the chance that the dentist takes in such cases, and yet his

profession is better fortified in public opinion than is ours. Perhaps the practice which we are condemning has a great deal to do with this relatively inferior position in public estimation.

Third molars which are fully impacted requiring the removal of a section of bone, following the incision and flap type of operation, should by all means be extracted in the hospital. It may be objected that such operations have been successfully performed in the office. This may be true, for luck frequently rescues us from the effects of our carelessness. But luck will not always be with us, and we should consider such factors as the nervous shock to the patient and again the danger of legitimate criticism from the medical brethren. After all, why not give the patient the best and the easiest operation from the point of view of nervous shock? Why not go shoulder to shoulder with the other specialists in the area of oral cavity? Consider the advantage of the hospital with its facilities in the case of a patient who gets a severe throat reaction from the operation. This frequently happens, as we all know, when a peritonsillar abscess results after the removal of a third molar, impacted or even not impacted. I have heard any number of patients express their satisfaction that they were in the hospital when this reaction set in. Many times I have heard them say, "I am glad I did not go to Dr. Blank, who would have extracted the tooth in his office." People appreciate the special care and attention that is given them. They do not fail to notice when they are treated carelessly and indifferently. From the standpoint of their satisfaction, of the opinion of us held by other professional men and of our own professional pride, there would seem to be ample reason for hospitalizing all such cases.

Incidentally, when the abscess develops, it is well to consult the family physician or the nose and throat specialist of the patient. We gain little by attempting to go ahead unaided, opening the abscess ourselves. Most of us can do it and successfully, but consultation with a medical man may save us from a very difficult situation, and it is always well to have the confidence of the physician. It is not well to try to be a power unto ourselves.

I have had patients referred to me from New York specialists for treatment where the work has been done in the office. The patient stood the operation well, but put in miserable nights following the operation. The socket was packed with medicated gauze, which helped until the patient was out of town. Remember there is another day; but here the New York specialist is looked up to just as the local oral surgeon is looked up to in his own town when the patient is referred to him from his family dentist. If the patient gets a severe reaction, he feels that the pain might be considerably worse if one operated who was not specially trained; and the New York surgeon's reaction would be, "Well, it could be or might have been worse if the local man did it." In any case, if you are called in, do not pass any slurring remarks about the condition of the mouth. If possible, say something good about some part of the mouth even if you cannot about the area in question. You never know how a little slur can start a lawsuit. Nowadays there are plenty of people looking for easy money; so be careful.

It may be said that this impacted tooth can be extracted without the removal of bone or with a very small amount. It is recommended that we simply

expose the crown; then the crown can be split with several sharp taps with the mallet on the chisel. Here again this enamel is occasionally rather heavy, and splitting is not so easy as some of our experts would lead us to believe. This thumping is not the best treatment for a very nervous, high-strung person, and here again you will find that you will have enough patients complain of numbness in the corner of their lip without adding to your quick and apparent short cut. Have your patient in the hospital, where you can take care of him with ease and safety and less likelihood of causing paralysis or nervous shock. This is assuming that you are using a local anesthetic. Now, if nitrous oxide is to be used, be sure of your patient and that you will not have to end up with a local anesthetic, for this does not help the nervous state of the patient. Then, unless the patient is a selected clinic type of case, you will find trouble keeping an airway clear.

There is the class of patient who lives in a boarding house, Y. M. C. A. or Y. W. C. A. Now picture this patient returning to his room from a dental office. He is cooped up in a small room with his own thoughts, and you can imagine the apprehensive type who has had several teeth extracted or, better, an impacted third molar removed, with an over-stimulated gland excreting saliva over the wounds. Expectorating into towels, handkerchiefs or paper, with them all strewn about, the mental reaction is terrible; the night seeming as long as one at the North Pole. This experience is one long to be remembered. Then suppose this person is inclined to bleed. By morning he is fairly well washed out, and it will be several weeks before he gets over this experience, and the nervous shock will long be remembered. What should be done? In taking the patient's history you learn of the little room, and you hospitalize the person and thus save him all these mental hazards.

The old idea of a hospital being a place to go to when you are about to die is past. Remember, general surgeons and nose and throat specialists operate in the home and office only occasionally and then only in extreme emergency. In other words, this is frowned upon and not considered good form. The patient is getting just a makeshift job, even if the surgeon is clever. The dentist has not kept up with the rest of his brethren of the healing art. The dentist's motto is, "Do everything you possibly can in the office; the main thing is to get the tooth or teeth out." Whether the nervous shock might prove to be greater than the individual can stand, does not enter into his consideration. He might or might not hear that the patient is later confined to his home under a physician's care for a week or so. Well, the patient had stood the operation well and was able to leave the office with a smile. Yes, but this was all done on reserve strength; he was expecting to be hurt. The nervous exhaustion following takes its toll. Remember that people live at a very high pitch nowadays, and they overindulge in foods and beverages and night life, and you cannot put too much stress on them or they will snap. Look to statistics on the neuropsychiatric hospitals; they are all overcrowded. Do not be the means of causing some good person psychic trauma because you overestimate your ability and think you can get away with a general extraction or impaction. Then your consulting with the patient's physician not only will make for better feeling with the patient and his physician, but will help raise the standing of the dental profession.

I have proposed, in the second place, to consider the importance of the choice of anesthetic. All anesthetics have their place in dental work, but it is most vitally important to consider individual differences when selecting an anesthetic for a particular case. That which is suitable to a healthy, calm, strong person might be altogether unsuitable or dangerous when used in the case of a child or an aged person, or even a youthful patient of good health but with tendencies in a neurotic direction. In every case we should consider the age, the physical condition, and the general background of the patient.

Children, of course, should be handled with great care. Generally speaking, I think they would develop a friendly feeling toward the surgeon, as well as their family dentist, were they to realize that he does not want to cause them pain in the extraction of teeth. Here nitrous oxide comes into its own. A slow induction with a little oil of orange rubbed over the rubber rim of the nosepiece, accompanied by a low-toned voice suggesting a trip to Florida, California or the circus, will help make things run off smoothly. Sometimes a spoiled child will not cooperate; but be firm and continue your suggestions; try an airplane trip, and, *above all*, no member of the family is to be allowed in the operating room. Occasionally you will run into a youngster who has had novocain or some other local anesthetic used successfully; then a local anesthetic can be used; but, generally speaking, I am very much in favor of nitrous oxide for children.

Now let us consider the middle-aged patients. I would consider the type, physical condition and last, but not least, the mental attitude. For any one who expresses fear of losing consciousness, never force the issue; a local anesthetic will make for more comfort on both sides. By treating the high-strung individual with a little premedication and nitrous oxide, you will invariably gain a friend. Now, the elderly person who is able to walk into your office and has no cardiac involvement or any discomfort in this organ, can with care be given nitrous oxide; but here I feel that the majority of office cases should be given novocain with no adrenalin.

Novocain, nitrous oxide, and ether have their places, like everything else, but they are not the latest in anesthetics. Avertin has stepped in, and while we have not the full control we should like to have with it, it is really a wonderful anesthetic for a high-strung person. I used it when it first came out, in a series of more than 490 cases at the Hartford Hospital. Then in November, 1933, some sample ampoules of evipal were brought down from McGill University by one of our staff and tried on one of our own medical interns. I had the honor of removing a mandibular third molar, much to his delight and comfort. Then followed a series of more than 82 cases. But here again, we did not feel that the patient was always under control. After simply figuring the age and weight of the patient and injecting in a 10 c.c. solution of this potent drug into a vein in the arm and waiting no longer than you would for a mandible novocain injection, the patient was thoroughly anesthetized. This did do away with the thrashing around and the prolonged excitement stage.

We are now coming to what I consider an ideal anesthetic. Same medication as for evipal, 1½ to 3 grains of nembutal (depending upon the patient) two hours; and ⅙ morphine $\frac{1}{150}$ atropine, one-half hour before the operation.

Then if for an elderly person, omit the nembutal and rely on the morphine. Then a 5 per cent solution of pentothal, mixed fresh before use, and slowly injected in a vein in the arm, using just as much as required. The average person will not be able to count over 12 or 15, and the average amount given is not over 2 to 4 c.c., and usually 10 to 15 c.c. will suffice for a general extraction taking thirty to forty minutes. If needed, a second syringeful can be used. The main thing in this anesthesia is to keep a clear airway; be sure the tongue is up and not dropped way back. Then keep the throat free from blood, because, as you all know, some of these operations are not bloodless. The beauty of this anesthetic is that the patient is as safe as possible, and you are not using up what little nerve reserve the majority of patients have. Now practically all my hospital operations are performed under pentothal; and in a series of more than 500 cases, I am 100 per cent in favor of this anesthetic. I do not feel that it is an anesthetic for use in the office generally speaking, at least as yet; but, without any premedication, paying attention to a clear airway and having a cylinder of oxygen always present, with a physician who can get into a vein without too much trouble, it is an anesthetic worthy of great consideration.

750 Main Street

CONCERNING NITROUS OXIDE AND OXYGEN

A Commentary

Frank J. Gaynor, D.D.S., Bridgeport, Conn.

GAS ($N_20.0$) has been accorded a primacy over local anesthetics in exodontia. I have operated with the former agent over a period of more than a decade to a relatively greater extent than with the latter. I am ready and willing to apprise its value, but I will not concede to it that selectivity in the field of dental surgery to which its devotees would promote it.

The medical profession is, I believe, more conservative in its attitude toward general anesthesia than is the dental profession: in fact, there is a noticeable disposition to develop substitutes for the respiratory media. Spinal anesthesia is being used and its technique of administration improved and perfected. Avertin and the other barbital derivatives are gradually superseding ether and chloroform; while these are classified as general anesthetics, their method of administration and their effects are entirely different from the latter, and their adoption indicates a tendency to get away from some disadvantages in the older forms. The increased adoption of local anesthesia for tonsillectomy is eloquent testimony of its adaptability in a sphere that matches the requirements of the dental field.

It is commendable to emphasize the importance of the personal equation of the patient in favoring gas (N_2O) for dental operations, inasmuch as its successful administration obviates the consciousness of pain and eliminates the nervous strain allegedly attendant on the use of novocain, but there are other and equally important considerations related both to the patient and to the operator which are not met so successfully under gas. The dentist's individuality should have some measure of sympathy in the scheme of things, because in the final analysis his interests are bound up with and complementary to those of the patient under his care. The case for gas is predicated on an overemphasis of the subjectivity of the patient alone.

It is not meant to be argued that the popularity of gas has been a spontaneous reaction of the laity, but rather it would seem to have been conditioned on two circumstances. Dislike and distrust of "the needle" are referable usually to the unpleasantness of a first experience, when haphazard and faulty technique contributed to the ineffectiveness of the injection to produce operable anesthesia. Frequently this has occurred to patients at an age most susceptible to impressions that remain fixed even after the recollection of their source has been lost—psychologists would call it a fixation. Such experience may not necessarily be personal, but its psychology may be produced in others by indirection and suggestion. The second circumstance that may explain the popular choice of gas

is the effect of specialization with its connotation of exclusiveness in a particular field on the laical mind. We are told that the popular approval of gas varies according to localities, and this may indicate not only the value of craftsmanship but the eloquence of operators on their particular anesthetic of choice. Of course, gas affords greater facility for the handling of a large clientele. Customarily, its use obviates preparatory delay, and production, so to speak, may be improved in a quantitative sense, at least.

No characteristic is more valuable to the surgeon (dentist) than composure, and nothing can militate to a greater degree against its maintenance than a sense of hurry. Admittedly, time is an important consideration in the employment of gas as an anesthetic agent, and, no matter how naturally collected in temperament the operator may be, haste cannot but have an unfavorable effect on him and on the ideal of surgical execution to which he is devoted and aspires. The desideratum of having the patient awake as soon as possible is concurrent with the intent of a successful operation, but, when any of these unpredictable situations so common to exodontia occur, the operator's finesse has to suffer some modification.

Equal in importance and, in fact, conducive to calmness is concentration; our minds function best in a single-track direction. In the constitution of a dental practice there cannot be any devolved responsibilities; at one and the same time the operator employing gas has to be anesthetist and surgeon. While the efficiency and responsibility of assistants may be beyond question, the dentist's attention is divided between the maintenance of the proper level of anesthesia and the actual performance of the operation: his hearing is attuned to detect any discrepancy in respiratory rhythm, his vision directs the delicate manipulation of his instruments as he watches facial color variations, while his mind has to coordinate all these senses. To say that all this is instinctive and automatic is to endow members of the dental profession with a divisible potency of which the parts are commensurate with the whole.

The characteristic volatileness and facile absorbability of nitrous oxide cause the condition of the patient under its influence to be less static than with other general anesthetics. There is a constant fluctuation in the narcotic levels, and the stages into which anesthesia is theoretically divided are not so specific in actual practice; eternal vigilance on the hair-trigger character of demarcation is mandatory. The longer anesthesia is maintained, the more difficult it becomes to preserve a satisfactory degree of relaxation between the extremes of near-consciousness with reflexes present or jactitation from dangerous oversaturation and asphyxia. While nitrous oxide may not theoretically have any marked effect physiologically on blood pressure, these physical phenomena must suggest some excitation of the cardiac mechanism beyond the normal.

There is a marked difference in the relationship of the dentist and of the physician toward their respective patients. In the case of the former, the attitude is one of passivity if not docility; with the latter the status is reversed. It is not the purpose, nor within the scope of this writing to analyse this conventional acquiescence in the predilections of the patient. I believe, however, that unwillingness to challenge a patient's choice of anesthetic, whether it be general or local, should not be the criterion of our procedure when our own

inclinations run contrariwise. In this connection, it would seem an assault on the correct interpretation of the ethical structure for one dentist to suggest, if not even dictate, the choice of anesthetic for a referred patient, in its implicit authoritativeness.

The appeal that gas makes to the laical mind is in the escape it seems to offer from the classical torture of extraction of teeth. No pain is so exquisite as that associated with the sensitory equipment of the teeth, and we are ready to apotheosize the dentist who can exorcise the evil spirit of such superlative agony from our consciousness. If the record were clear in this respect, the argument in favor of gas would be unanswerable, but we know that the percentage of postoperative intervention with local anesthesia for the removal of residuary tooth fragments is high. This circumstance is not essentially fortuitous nor yet a reflection on the operator's efficiency. The exigency of time, the physical factors of tooth formation, structure and condition, visual and manual inaccessibility, and other controlling elements create hazards that the inexorable law of averages makes inescapable while it mocks the vaunted perfection of the best techniques.

So long as the degree of narcosis has been marginal and its duration limited, a patient's recovery is, under ordinary circumstances, almost immediate after nitrous oxide. Its general effects are transitory. On the other hand, local anesthesia leaves the uncomfortable aftermath of numbness that may persist for an hour or so with the likelihood of a characteristic aching when the tissues begin to regain their normal blood supply. However, if the scope of the operation necessitates prolonged anesthesia with a more profound narcosis, the general effect from nitrous oxide may be present subjectively for hours and days.

No scientific basis has ever been proved for the alleged exacerbation of afterpain from local anesthesia. We know, as a matter of fact, that the degree of postoperative pain is usually proportionate to the amount of trauma incident to any extraction, no matter whether general or local anesthesia has been employed. The excuse and the occasion for trauma, however, are much less with local than with general anesthesia. The conditions of working under the former are conducive to the application of a more conservative procedure in technique, with the environment of time, poise and physical facilities all more favorable to the operator than when gas is used.

The gas machine has an honorable place in the armamentarium for exodontia. It deserves respect for its purpose so far as this is executed rationally and discreetly. We would not, however, make it the hub, with the less spectacular agencies as mere spokes in the scheme of our economy.

881 Lafayette Street

BLOCK ANESTHESIA FOR THE MAXILLA

R. Noble Peckham,* A.B., D.D.S., Detroit, Mich.

A BLOCK anesthesia for the maxilla similar to the one used commonly for the mandible is something that any practitioner in dentistry, especially those who are working in the fields of oral surgery and exodontia, should desire. Dentists all know that it is common practice to make at least five injections to anesthetize the posterior, middle, and anterior superior alveolar nerves, and the anterior palatine and nasopalatine nerves. These injections are always a source of discomfort to the patient, skillful and careful as the operator may be, both at the time of injecting and also postoperatively.

Why, then, has not the maxillary block, or second division injection, as it is commonly referred to, been put into more common usage? The commonest criticism that is presented among practitioners seems to be that we are encroaching upon unfamiliar and dangerous structures while making this injection; but who should be more familiar with anatomical structures than the dentist, who spends at least six years of college preparation culminating in a specialized practice of work in the oral cavity and its surrounding structures? When this criticism is voiced by a doctor of dental surgery, it would seem either that he is uncertain of the cranial anatomy or that he lacks self-confidence, which can be gained only by experience in this particular field.

How many dentists cannot remember seeing for the first time the mandibular or inferior alveolar block being given, and at the same time marveling at the skill and knowledge of the operator whom they watched. This I believe to be somewhat the same feeling that most dentists experience when they see or read of this second division injection being made. Yet I earnestly feel that, with the background that every member of the dental profession must have in order legally to practice his art, he is equipped to execute this seemingly difficult and dangerous injection with comparative ease and safety, at least without any more hazards and difficulties than the mandibular injection presents which so many dentists are commonly using today in their practices.

The anesthesia for this second division injection of the trigeminal nerve is obtained by depositing a local anesthetic solution in the vicinity of the sphenopalatine ganglion. This is accomplished by entering the posterior palatine foramen which opens into the pterygopalatine canal and carrying a needle up this canal approximately one and a half inches. A local anesthetic solution deposited in this canal with the needle at this depth will anesthetize the ganglion and its branches and also the maxillary nerve from which the sphenopalatine or Meckel's ganglion is so closely suspended. These are the branches of the trigeminal nerve which innervate the maxilla and supply all the maxillary teeth on one side of the head and which, when influenced by novocain or some similar local anesthetic, produce a profound anesthesia of these parts.

*Resident in oral surgery, Harper Hospital.

The technique which I employ for executing this injection follows:

The patient's head is tipped backward in the headrest allowing a clear view of the roof of the mouth and its surroundings. The mucous membrane under which lies the posterior palatine foramen is rubbed with a dry swab, re-

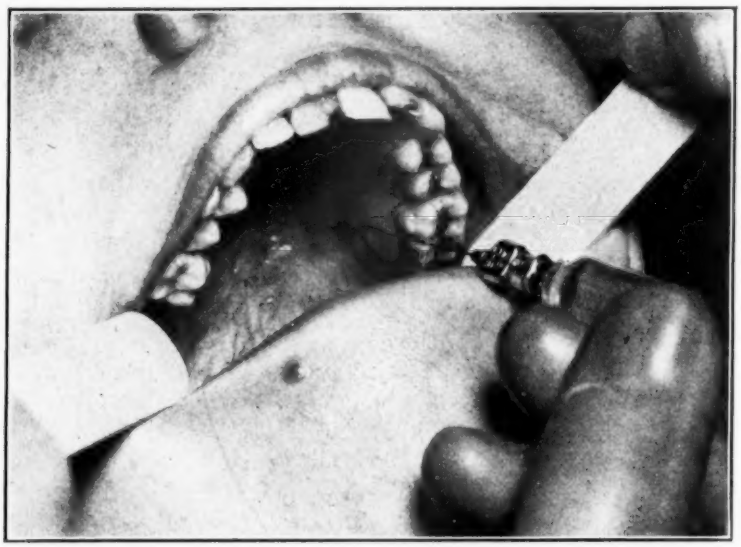


Fig. 1.—Posterior palatine foramen being located.

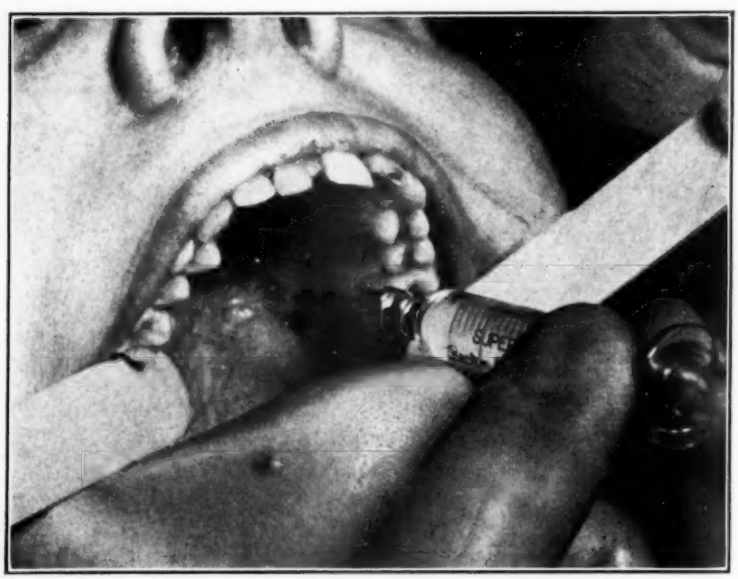


Fig. 2.—Posterior palatine foramen located and needle in pterygopalatine canal approximating Meckel's ganglion.

moving any saliva or mucous secretion which may be present, and an antiseptic solution is applied to this area. I routinely use a 2 per cent iodine solution for this procedure, though there are others just as practical. The point where I have nearly always found the posterior palatine foramen to be lies on an imaginary line drawn from the middle of the maxillary second molar medially

along the roof of the mouth to the midline (or fusion line) of the palate and slightly less than halfway from the crest of the alveolar ridge to the midline of the palate.

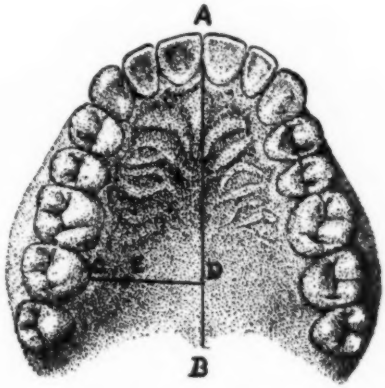


Fig. 3.—Diagram illustrating method of finding posterior palatine foramen. *AB*, Fusion line of palate; *CD*, imaginary line drawn from middle of maxillary second molar medially along roof of mouth to fusion line of palate; *E*, point on this imaginary line slightly less than halfway from crest of alveolar ridge to fusion line.

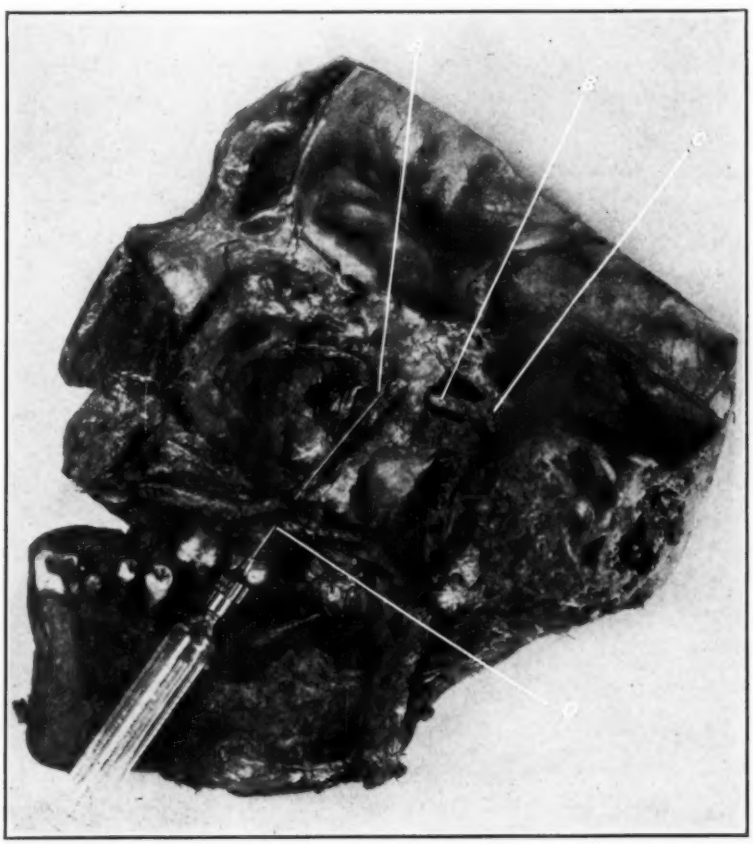


Fig. 4.—Sagittal section of head showing position of needle during maxillary block. *A*, Sphenopalatine ganglion attached to maxillary nerve after it has passed through foramen rotundum; *B*, maxillary division of Gasserian ganglion before entering foramen rotundum; *C*, Gasserian ganglion; *D*, posterior palatine foramen.

With the mucous membrane at this point having been thus prepared, a needle of 25 gauge and 1⅞ inches in length is quickly inserted beneath the soft

tissue under which the posterior palatine foramen lies; and a few drops of the anesthetic solution are deposited immediately, which will anesthetize the palatal soft tissue in this area, allowing the operator carefully to "step" the point of the needle about until he feels the tip of the needle slip into the foramen. This entrance point to the pterygopalatine canal can usually be found from this first puncture site, although additional punctures may be needed until the foramen can be found. This will, however, cause no discomfort to the patient because this entire area has been previously anesthetized with the first few drops of the anesthetic.

After the posterior palatine foramen is located, the needle is in position to be directed up the pterygopalatine canal and to approximate the sphenopalatine ganglion. Keeping a small amount of solution ahead of the needle point, the needle is carried through the foramen and directly upward in the pterygopalatine canal to a depth of one and one-half inches. Any resistance that can be felt during this portion of the injection is an indication to the operator that he is not holding the needle parallel to the walls of this canal. The needle should immediately be withdrawn slightly, and the course of the insertion should be corrected and the injection then be continued. Now with the needle in the pterygopalatine canal at a depth of one and one-half inches, between 1 c.c. and 1.5 c.c. of anesthetic solution are slowly deposited. The needle should then slowly be withdrawn.

The patient can usually express symptoms of anesthesia five minutes after this injection has been given, although there are some patients who require a longer interval, as is the case sometimes with the familiar mandibular block.

Symptoms which the patients describe that are indicative of anesthesia being present are: a sense of numbness of the upper lip on the side of the face the injection has been given, extending to the midline; also a numbness or "prickly feeling" on the corresponding side of the nose, and a numb sensation of the lower eyelid. The entire roof of the mouth will also have the characteristic "dead feeling." When these symptoms are evidenced by the patient, the operator can be assured that anesthesia is present, and the required operative work may be readily begun. Any operating to be done at the midline, such as the extraction of a central incisor, should be preceded by an infiltration extending to the opposite side of the midline to anesthetize any interlacing nerve fibers present.

In a series of one hundred injections of this type done at Harper Hospital in a period of three months (November, 1937, to February, 1938), no ill effects were evidenced by any of the patients, and a profound anesthesia lasting from two to six hours was secured in all cases.

In the future we should see this block or conduction type of anesthesia being used for operations involving the maxilla as it is now being employed for the mandible.

I am indebted to Mr. Frank N. Ruslander of Harper Hospital for photography and to Dr. Wm. A. Cook, Chief of Staff, Oral Surgery, Harper Hospital, for loan of anatomical specimen.

BLOOD DYSCRASIAS FROM A DENTAL POINT OF VIEW

THOMAS J. COOK, D.D.S., PHILADELPHIA, PA.

(Continued from page 586, June issue)

PART III

PURPURA HEMORRHAGICA

THE essential hematologic features of this disease are a low platelet count, prolonged bleeding time, evidence of normal regeneration of blood, delayed retractility of the clot, normal coagulation time, and the absence of changes in morphology of the formed elements of the blood that are distinctive of other hemorrhagic diseases. In the absence of poisoning, particularly from arsenical preparations and acute infections, the disclosure of these conditions in a hematologic examination of a patient presenting petechiae, ecchymosis, bleeding from one or more mucous membranes, and anemia of varying degree, leaves no question as to the nature of the disease.

Pemberton[29] feels that many of the patients with chronic purpura hemorrhagica of mild severity, after removal of foci of infection, improve and remain in excellent health under adequate medical supervision. In those cases, however, in which the hemorrhagic tendencies persist in the form of recurring crops of petechiae, and perhaps an occasional slight nosebleed, and in which, in addition, a condition exists for which a major surgical operation is indicated, the spleen should be removed first as a precautionary measure, lest uncontrollable bleeding complicate the operation performed for the principal complaint.

Nygaard[30] in studying seventeen cases of thrombocytopenic purpura found the data given in Table III.

CASE 1.—A white male, aged 12 years, was admitted to the University Hospital, January 16, 1936, complaining of frequent large bruises and nosebleeds.

The inception of the patient's illness was first recognized in December, 1933, when, following a trivial contusion which the boy received when his right maxilla inadvertently struck upon a blunt pencil sharpener, there developed a large dark purple bruise, the size of a lemon, which remained ten days or more before fading. Immediately after this minor injury his nose bled copiously, failing to respond to the usual measures of treatment, until finally a half hour later it was controlled by packing. For the following two weeks profuse epistaxis, equally intractable, recurred every day or so, often requiring one or two packings before being completely controlled. With unmitigated frequency and severity the episodes of nose bleeding occurred for the following seven months, with free intervals of one to two weeks' duration when the bleeding was either slight or nil. During this seven month interval, the boy bruised upon the slightest injury. On occasions his skin was so discolored that, as the mother stated, "You couldn't place a quarter on his body but what it touched some bluish-black area." The frequency of occurrence of these ecchymotic spots bore no

From the University of Pennsylvania, School of Dentistry.

TABLE III

CASE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	NORMAL
Age and Sex	37F	52M	13F	57M	32M	34M	44F	17F	67F	52F	37M	6F	40F	52F	6M	53F	25F	
Platelets in thousands	69	7,425	12,5	13,3	15,	15,	15,4	16,	16,5	19,	26,750	39,	28,	40,	46,	49,	57,	250,000 300,000
Bleeding time in minutes	11	8	5	2½-11	2½-9	60	30	30	10	30	3½	4-16½	7-12½	34	90	16	6-12½	1-3
Coagulation time	9	8	6	8	8	12	3	4	9	8	9-11	5	8	6	6	8	5	5-10

seeming relationship to the severity of the nose bleedings or its free intervals, the former recurring more or less constantly during the seven months, since when, by a course of direct transfusions (6) over a period of five months ending October, 1934, the epistaxes have been slight and infrequent, and the infrequency and severity of the ecchymoses greatly reduced. (Of the transfusions, his father gave three, his brother two, and sister one.) Before the transfusions were given, the "red blood cells were reduced to a third their normal number," June, 1934; the patient was then in a local hospital, where he remained for three weeks. Following his discharge his mother, being skeptical and unconvinced, applied to some "Indian herb doctor" who gave the boy "herb tea" over a period of about four months, toward the end of the ninth week of which time the blood count was repeated and found to be "normal." (It is of no small interest to know that transfusions were also given during this interval!) At the time of the repetition of the counts, "platelets were low." During the entire duration of his illness, the patient had noticed that his gums bled readily upon brushing his teeth. Last summer several "buried roots" were removed; oozing that was difficult to control followed.

In general the child has felt quite well, though naturally a bit weakened during the time of his increased blood loss. He complained of no pain or discomfiture, no gastro-intestinal disturbances, and especially there had been no hematemesis, hemoptysis, hematuria,

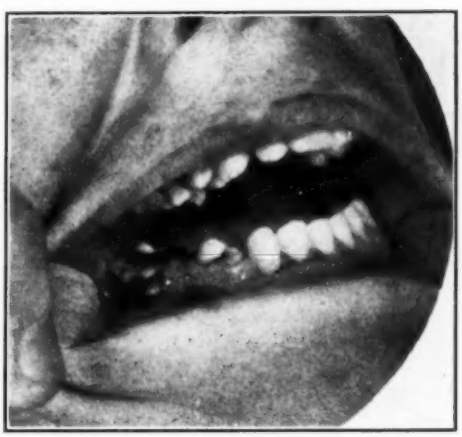


Fig. 7.—Photograph demonstrating the oozing of blood from the mandibular right molar region from where a small residual root had been removed several weeks before, in the mouth of a patient who had purpura.

tarry or bloody stools, or arthritic complaints. No recognized fever. It was essentially because of the necessity for the removal of certain decayed teeth and the fear of the consequent potential danger that brought the patient to the city hospital for treatment.

Physical Examination: A well-developed, well-nourished white lad of 12 years, lying quietly in bed, affable, friendly, mentally alert, and intelligently cooperative. Upon examining his mouth we found moist ruddy lips. His tongue protruded in the midline, coarsely fissured; there was no papillary atrophy; no tremor. The gums appeared a trifle reddened, with a bleeding point on the malar aspect of the right lower gum, opposite the second molar. (This is said to be the site of incision for the removal of a small tooth root several weeks before.) The mandibular molars were extensively carious, and there were a few petechiae on the buccal mucous membrane.

Progress notes: (N.B.: Following easy venepuncture for Wassermann reaction blood it was noted that bleeding continued for about ten minutes; regional petechiae developed. The blood in the tube had not retracted three hours later.)

January 17: Developed spontaneous epistaxis, subsiding in about eight minutes, ice being applied locally. Lost 3 ounces of blood.
Packing was not required. Blood count: R.B.C., 4,200,000; W.B.C., 10,800; Hb., 74 per cent; platelets, 19,200.

January	19:	Given 125 c.c. of citrated blood from father. Dental report: the teeth had been badly neglected. In a normal child there would be no question as to whether there should be extractions. There were obvious dangers here, even though packing, pressure bandage, et cetera, could be used. Perhaps a test operation could be done by removing a loose deciduous molar root.
January	20:	Had epistaxis with moderate blood loss. The maxillary right second deciduous root (loose) was removed with moderate but controlled bleeding.
January	21:	130 c.c. citrated blood received.
January	23:	Results of tourniquet test: petechiae appeared in six minutes.
January	24:	Developed profuse epistaxis for fifteen minutes. Controlled by deep, tight packing. Blood loss 400 c.c.
January	25:	Brief spontaneous epistaxis. Parents were advised that immediate series of transfusions followed by splenectomy was the indicated therapy. His mother was insistent in her desire to take the boy home. Patient discharged.

This case is of extreme importance to the dentist, since it is absolutely necessary that at least four permanent teeth be removed. The patient will no doubt eventually visit a dentist's office with acute dental infection which will be accompanied by pain, and should extraction be performed, it will be followed by serious consequences. The patient's home dentist was so advised.

Dalitsch[31] is of the opinion that complications may arise orally if careful hygienic measures are not instituted to ward off attacks from the ever present fusospirillar organisms. Frequent sites of hemorrhages are the gums and oral mucous membrane, and Kahn[32] points out that purpura, above the other dyscrasias, seems more commonly accompanied by excessive, prolonged, and irregular uterine bleeding.

CONCLUSION

Slight injury may produce bleeding or a hematoma. Light percussion over bony prominences may produce ecchymoses. Death may occur from hemorrhage and exhaustion, or there may be complete recovery in a short time.

HEMOPHILIA

As a contrast to purpura hemorrhagica, there is a normal number of platelets present in this disease, normal bleeding time, and normal retraction of the clot, but a marked delay in the coagulation of the blood. There is a family tendency toward bleeding which is chiefly confined to males. Table IV (by Watkins) is extremely interesting.

Hemophilia occurs only in males, while it is transmitted directly through females. There is no direct transmission from a person with hemophilia to his son. People with hemophilia transmit the disease through their daughters to their grandsons.

Birch[34] feels that the female in order to transmit the disease must potentially have the disease. Nature seems to have provided that this disease go on forever, because the transmitters of hemophilia have more sons than daughters, while persons with hemophilia have more daughters than sons.

Scher[35] reported a case of dental interest: A male, aged 25 years, with a history of hemophilia had several teeth removed following preoperative medication. The teeth were removed under a general anesthetic. Hemorrhage was severe and difficult to control, but finally arrested. The patient had two brothers who died following the removal of teeth.

TABLE IV

FEATURES OF COAGULATION IN HEMORRHAGIC DISEASES (WATKINS[33])

CHARACTERISTICS	HEMOPHILIA	PURPURA HEMORRHAGICA	APLASTIC ANEMIA	ACUTE LEUKEMIA
Leukocyte count, total	Normal	Increased or normal	Progressively decreased	Normal, increased or decreased
Leukocyte count, differential	Normal	Normal distribution; normal cells	Relative lymphocytosis	Immature cells especially stem cells
Signs of regeneration of erythrocytes	Normal	Reticulocyte count usually increased; polychromatophilia and anisocytosis	Reticulocyte count low; polychromatophilia and anisocytosis usually absent	Usually normal
Platelet count	Normal	Decreased	Decreased	Increased, normal or decreased
Bleeding time	Normal or slightly prolonged	Prolonged	Prolonged	Normal or prolonged
Coagulation time, venous blood	Prolonged	Normal	Normal or prolonged	Normal or prolonged
Retractility of clot	Normal; reclotting phenomenon	Delayed or absent	Normal, delayed or absent	Normal, delayed or absent
Prothrombin time	Prolonged	Normal or prolonged	Normal or prolonged	May be prolonged
Tourniquet test	Negative	Usually positive	Frequently positive	May be positive
Heredity	Positive, occurs in males, transmitted by females	Little significance	No significance	No significance
Joint hemorrhages	Common	Rare	Rare	Rare
Petechiae and purpura	Rare	Common	Common	Not uncommon

Cruttenden[36] reported a male, aged 45 years, who was admitted to the Miller Hospital, St. Paul, Minnesota, with profuse bleeding from two tooth sockets following extraction, which had been done one week before under gas anesthesia. The hemorrhage persisted for five days after entering the hospital.

CASE 1.—A male child, aged 5 years, was admitted on November 9, 1929, to the University Hospital because of a cervical abscess, at which time the diagnosis of hemophilia was made. Four months before, he had suffered a twisted ankle, which became swollen and black.

December 14, 1930: Second admission, because of a large hematoma of the right ankle.

January 18, 1931: Third admission: Oozing for two days from gum about a loose deciduous tooth.

August 5, 1931: Fourth admission: Bleeding from a cut on right foot.

February 24, 1932: Fifth admission: Hemarthrosis of left hip.

August 5, 1932: Sixth admission: Bleeding from the gums about two loose deciduous teeth, which were removed while in the hospital.

May 27, 1933: Seventh admission: Pain in maxillary permanent molar which was badly decayed. Following medical treatment the badly decayed teeth were removed. There was some oozing from the sockets for about three hours. Convalescence was uneventful.

February 11, 1934: Eighth admission: Bleeding from lips and the gums around the anterior teeth as a result of a sledding accident.

July 23, 1934: Ninth admission: Oozing from small wound on right hand.

November 26, 1934: Tenth admission: Swelling of mandible as the result of an infected mandibular first molar. Preoperative medical attention preceded extraction. There was a moderate hemorrhage following the extraction; convalescence was uneventful.

CASE 2.—A white male, aged 11 years. The patient was a known hemophiliac, with twelve hospital admissions. Complete studies were done on various admissions. His clotting time averaged around 90 minutes. The majority of his admissions were for treatment of joint conditions. He had had hematomas of nearly every joint of all his extremities. The typical history was initial swelling of joint followed by pain, tenderness to touch, limited motion, and it became hot, tender, black and blue. Frequently there was no history of trauma.

Fig. 8.—Photograph showing the results following a mandibular injection for the removal of a molar in a young boy who had hemophilia. (Dr. R. H. Ivy's case.)

General symptoms of fever, malaise, dizziness, dyspnea, and palpitation on exertion, with some lymphadenopathy, were frequently present.

A review of the admissions revealed that on each of the first ten admissions transfusions were resorted to because of some bleeding externally or parenterally. This treatment proved to be almost the only thing that caused any conclusive stopping of bleeding—aside from a "dramatic response" once from autohemotherapy while having a bleeding gum about a tooth (6th admission). On other admissions, adrenalin, beefsteak, ovarian extract, and liver extract were tried, and results were conclusively good. Subsequently sensitization to Sharp and Dohme preparation was unsuccessfully tried, and also intravenous Congo red.

December 21, 1935: Patient was started on placental extract treatment by mouth, 10 c.c. being given. On following days 20 c.c. daily.

December 23: Following administration of 50 c.c. of placental extract by mouth the clotting time fell to 30 minutes.

December 24: Discharged to take remainder of placental extract at home.

January 14, 1936: Had another typical hematoma of right leg above knee following injury in playing. Had usual course.

February 10: Bleeding time, 1 minute; coagulation time, 2 hours.
February 17: Coagulation time 2 hours.
February 18: Placental coagulant given, 10 c.c. t.i.d.
Coagulation time taken 3 hours after last dose—3 hours.
February 19: Placental coagulant given, 30 c.c.
February 20: Placental coagulant given, 10 c.c.
Coagulation time taken 6 hours after last dose—3 hours.

Conclusion from this limited trial of placental coagulant tends to confirm previous impression that patient is one of those individuals who do not respond readily to this type of therapy.

CONCLUSIONS

Since it has been reported on numerous occasions that death followed the extraction of teeth in patients having this disease, it seems that the patient should be hospitalized and properly prepared before extraction is attempted. Although there are many methods of medication, our knowledge of the etiology of hemophilia is little advanced over what it was a century ago.

REFERENCES

29. Pemberton, J. deJ.: The Diagnosis and Treatment of Purpura Hemorrhagica, Proc. Staff Meetings of Mayo Clinic, **9**: 532, September, 1934.
30. Nygaard, K. K.: Coagulability of the Blood Plasma and Changes in the Number of Platelets in Thrombocytopenic Purpura, Proc. Staff Meetings of the Mayo Clinic **9**: 492, August, 1934.
31. Dalitsch, W. W.: The Influence of Fusospirillar Infections on Thrombocytopenic Purpura, Med. Clinics of North America **17**: 1677, May, 1934.
32. Kahn, M. E.: Abnormal Uterine Bleeding in Blood Dyscrasias, J. A. M. A. **99**: 1563, November 5, 1932.
33. Watkins, C. H.: Acute Leukopenic Leukemia and Its Differential Diagnosis, Wisconsin M. J. **32**: 156, March, 1933.
34. Birch, C. L.: Hemophilia, J. A. M. A. **99**: 1566, November 5, 1932.
35. Scher, I.: Successful Treatment of Dental Hemorrhage in a Case of Hemophilia, Brit. D. J. **53**: 714, August, 1932.
36. Cruttenden, L. M.: Hemophilia: A Case Report, Dental Cosmos **69**: 1150, September, 1927.

SUPERNUMERARY BICUSPIDS

HARRY J. FIELD, D.D.S., AND A. A. ACKERMAN, D.D.S., NEWARK, N. J.

THE patient, a boy of 12 years, was referred by his orthodontist because of the failure of eruption of the mandibular left first bicuspid. Radiographic examination (Fig. 1) had revealed the presence of a supernumerary tooth preventing the normal eruption of the bicuspid.

Fig. 1. Fig. 2.

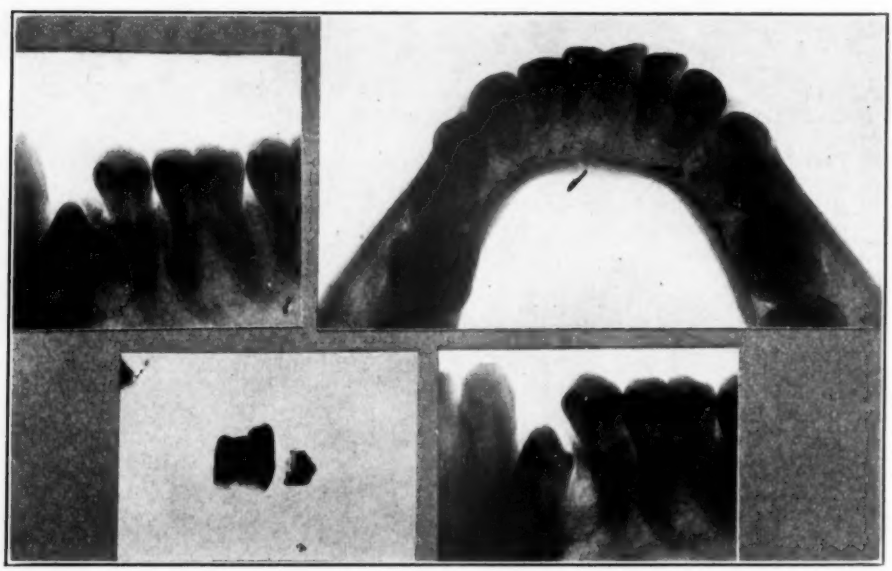


Fig. 3. Fig. 4.

A bite-view was taken (Fig. 2) to ascertain the buccal-lingual relationship of the involved structures. It will be observed that the supernumerary body lay definitely on the lingual aspect of the mandible beneath the dense cortical plate of bone.

The surgical problems involved in the successful removal of this body were obvious. The close proximity of the tooth to the three adjoining teeth called for considerable care to prevent damage to these teeth. Following a careful dissection through the lingual cortical plate, we were able to expose about three-fourths of the occlusal aspect of the crown of the tooth. The embedded mass was freely movable in its follicular bed, although the size of the aperture in the bone would not permit its displacement. Any further reduction to increase the size of the aperture in a mesiodistal direction would definitely expose the roots of the cuspid and bicuspid.

For this particular situation the automatic mallet is admirably well adapted. This instrument is capable of splitting the crown of a solid tooth into sections through the occlusal grooves. Thus we were able to divide the original body into two equal sections (Fig. 3). Each of these sections was easily removable through the aperture already created in the lingual plate. The immediate post-operative radiograph (Fig. 4) reveals the normal condition of the alveolar structure about the adjacent teeth.

130 Market St.

Case Reports

This month we have two interesting cases to report, both from Dr. William H. Hyde of Brooklyn, New York. Case No. 7 is particularly interesting because from the x-ray point of view the diagnosis might well be parodontal cyst.

Discussion of these cases is invited. Comments should be sent to Dr. Kurt H. Thoma, 47 Bay State Road, Boston, Mass.

CASE NO. 7

ADAMANTINOMA

WILLIAM H. HYDE, D.D.S., BROOKLYN, N. Y.

A MALE, aged 16½ years, born in the United States, white, a student, presented himself at my office on Oct. 12, 1937, with the following complaint.

Chief Complaint.—A large swelling in the region of the right mandible of two weeks' duration.

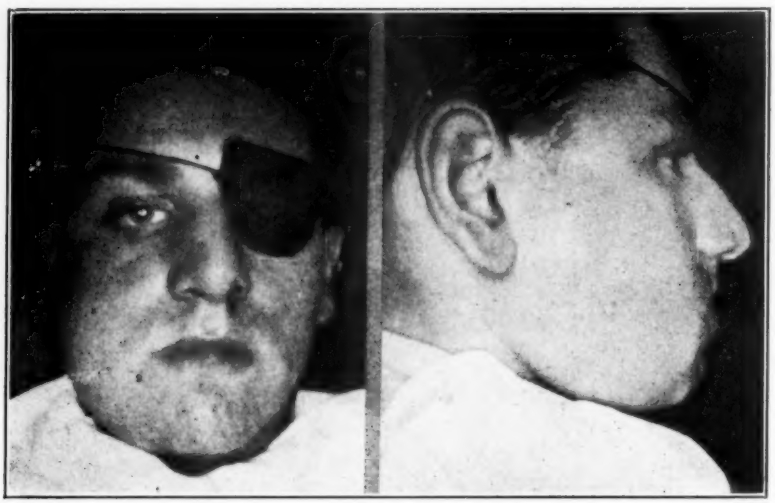


Fig. 1.

Fig. 2.

Present History.—The patient was treated for mumps by his physician with no relief. Temperature rose to 102° F., and trismus was present with marked adenopathy on the right side. Two days later he complained of pain in the mandibular right molar region. The dentist was called in consultation, and he considered the condition due to a developing mandibular right third molar. The patient was referred to me.

Past History.—About six years before he had had a glioma of the left eye which necessitated the removal of the eye. Two years following this condition there developed a large amount of hypertrophic tissue in the eye socket which necessitated a second operation. As a result of this operation the eye socket

Fig. 3.

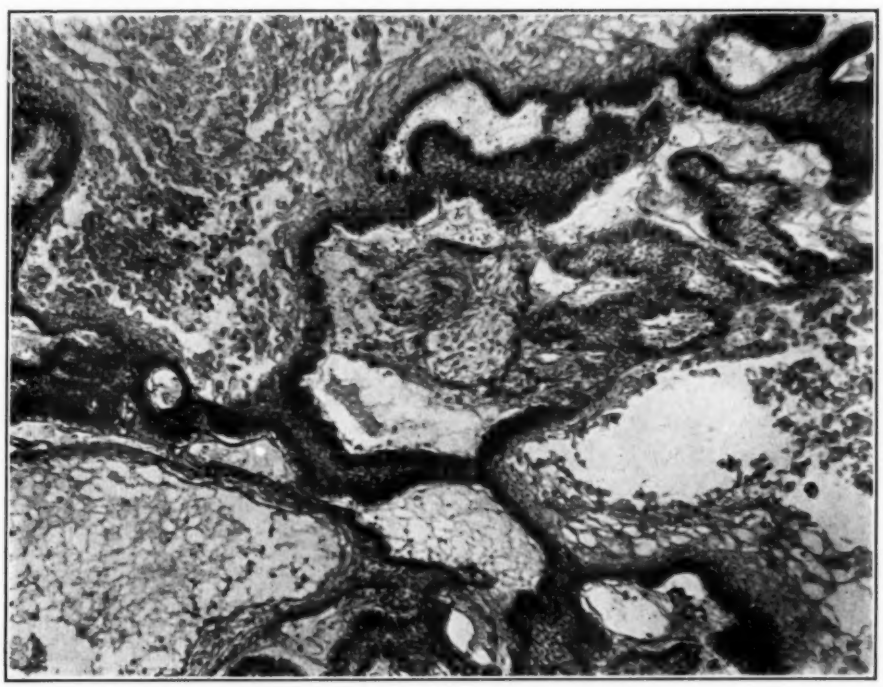


Fig. 4.

became very deep, and the patient refused to wear an artificial eye because of the marked deformity. He, however, wears an eye shield.

Examination.—A young man, well developed, presented with the left eye socket covered with an eye shield (Fig. 1). The side of his face was swollen

and the periosteum on the right distended. The swelling extended from the right cuspid area to the temporomandibular joint above, posteriorly to the mastoid, and below to the hyoid bone (Fig. 2). The swelling was stony hard. No fluctuation was present, but there was trismus and a fetid odor from the mouth. The tongue was covered with thick white fur. Intraorally the mandibular right third molar was partly erupted, the mucous membrane in that area was injected.

X-ray Examination.—A large rarefied area is shown extending from the third molar to the sigmoid notch, suspicious of adamantinoma (Fig. 3).

Treatment.—On Nov. 3, 1937, the patient was hospitalized, and under a general anesthetic the large mass in the right mandible together with the molars was removed. The pathologic examination revealed an adamantinoma. He remained at the hospital for approximately two weeks, and treatments were continued at my office.

Subsequent History.—At the present time the patient is making an uneventful recovery. All the signs enumerated above have disappeared, and his spirits are normal.

Pathology.—Dr. K. H. Thoma, Department of Oral Pathology, Harvard University, made the following report: Microscopic examination of the slide submitted showed epithelial follicles of irregular shape and arrangement (Fig. 4). These were lined by columnar, cylindrical cells which were backed by stellate cells that gradually underwent a change to squamous cells. Most of the large follicles contained loosely connected squamous cells. In other follicles was seen a syncytium of colloidal nature, probably representing an abnormal secretion of the ameloblastic cells, and in still others the cells showed hydropic changes, undergoing cystic degeneration. Numerous microcystic formations were noted. The follicles were surrounded by connective tissue which showed a very loose but vascular arrangement. There was evidence of erythrocytic and leucocytic exudate. The tumor was not encapsulated and showed infiltrating characteristics.

Diagnosis.—Adamantinoblastoma.

CASE NO. 8

ADENOCYSTIC BASAL-CELL CARCINOMA

WILLIAM H. HYDE, D.D.S., BROOKLYN, N. Y.

A MALE, aged 44 years, married, born in the United States, letter carrier, colored, presented himself at my office on Oct. 19, 1936.

Chief Complaint.—Food entered his nose, and speech was interfered with.

History.—About nine years before the patient had complained of a swelling in the right maxilla, and this was radiographed by his dentist. A diagnosis of

radicular cyst was made, and the patient was referred to an oral surgeon who removed the cyst together with the two bicuspids and three molars. About a year and a half later there was a recurrence of the cyst, and at that time the cuspid, central incisor and lateral incisor were removed and a diagnosis of carcinoma was made. Radium treatments were instituted. He was treated with radium and deep x-ray therapy for two years, during which time he had no relief.

In April, 1931, he was given 15,000 mg. hours with the 5 gram radium pack. In October, 1934, he visited the Jewish Hospital; he had a necrosis of the hard palate. In July, 1935, he returned to the Bellevue Hospital, and a diagnosis of basal-cell epithelioma of the adenoid type was made. He was given 25,000 mg. hours of radium. On Nov. 10, 1936, again at the Bellevue Hospital, a diagnosis was made of angioendothelioma, and treatment was rendered for such.

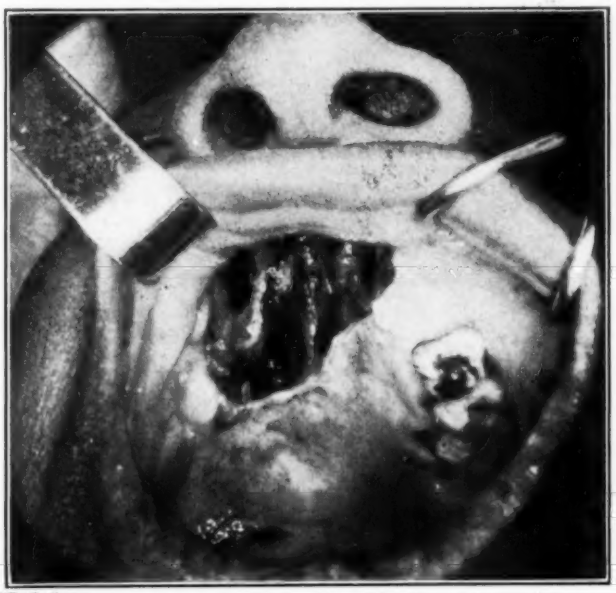


Fig. 5.

He was given interstitial radiation to the lesion on the right palate; a total dose of 1,621 mg. hours was administered.

As stated in his own words, the patient felt miserable; his speech was impaired, and his palate was perforated. The result was continued oozing from the right nostril. Fluids taken by mouth would embarrass him by entering his nose and passing out of the anterior nares. He visited many nose and throat specialists, who substantiated the diagnosis made at the hospital. They informed him that he had an inoperable cancer of the jaw. For the past year he had been experiencing a great deal of pain and discomfort; he objected strenuously to x-ray therapy and radium treatment. He pleaded for relief.

Examination.—I took x-ray pictures, which showed involvement of the maxilla and the nasal cavity that might be interpreted as characteristic of adamantinoma. After a very careful clinical examination, I was of the opinion

that perhaps this might not be an inoperable carcinoma of the jaw, in view of the fact that he had a splendid physical condition, a hearty appetite, and had had this condition for the past nine years. It occurred to me that the perforations might perhaps be due to the radium treatments, rather than the carcinoma, as was believed by the physicians who had examined him before.

Local examination (Fig. 5) showed a hard bony swelling of the upper right maxilla and side of the nose. Intraorally a slough extended from the palate and right side of the vestibule to the maxillary left first molar region. The area was brownish red in color with a very large opening extending into the nasal cavity. The patient had difficulty in speaking, presumably due to the condition of the palate; also there was marked fetor from the mouth.

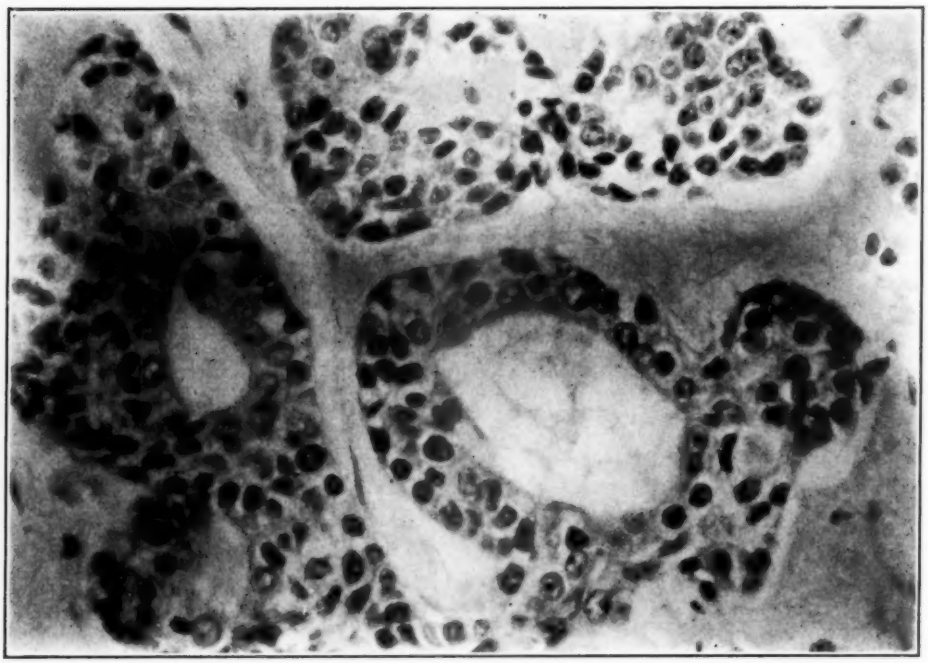


Fig. 6.

Treatment.—In October, 1937, he was admitted to the hospital and the entire palate from the right side to the left second molar was removed under intratracheal anesthesia. Approximately 4,000 mg. hours of radium were given at that time.

Pathology.—The pathology department of the hospital made a diagnosis of adamantinoma. Dr. C. Geschickter of Johns Hopkins Hospital, to whom I submitted the slides, reported as follows: The section showed a basal-cell lesion with numerous small dilated acini and a rather prominent fibrous stroma. Portions of the tumor were growing in a fashion typical of adenocystic basal-cell cancer. The stroma suggested the type of tumor seen most frequently in the parotid.

Dr. Thoma, of the Department of Oral Pathology, Harvard University, gave the following description: Microscopic examination showed this to be an

epithelial tumor with the tumor cells tending to differentiate into glandular structures. It was made up of numerous glandular alveoli which contained granular material or else squamous cells (Fig. 6). The tumor had an infiltrating character, and there were a few mitotic figures present. It was of moderate malignancy. Diagnosis: adenocystic basal-cell carcinoma.

Subsequent History and Treatment.—I saw this patient about a week ago. He was feeling considerably better, had lost no weight, and encountered very little trouble in breathing. I have, however, suggested intermittent examination of his mouth, and have advised another treatment with large quantities of radium.

Department of Orthodontic Abstracts and Reviews

Edited by

DR. EGON NEUSTADT, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. Egon Neustadt, 133 East Fifty-Eighth Street, New York City.

Investigations Into Dental Conditions of About 3,000 Ancient and Modern Greenlanders. By P. O. Pederson, Dental Record **58**: April, 1938.

These investigations were carried on in three main groups: (1) Eskimo skulls; (2) East Greenlanders; and (3) West Greenlanders.

Eskimo Skulls.—The 526 skulls examined at the Normal Anatomic Institute of Copenhagen University were brought back by several Danish Arctic expeditions and are at least 200 years old. Of the 526 skulls, 236 were men, 210 women, and 80 children. The total number of teeth present were 7606. The total number of deciduous teeth were 156.

A large number of teeth were found missing from the jaws (59.8 per cent); yet it can be regarded with certainty that only 6 to 8 per cent were lost during life. The teeth lost during life were molars; those lost after death were anterior teeth, in all probability as a result of their thin alveolar supports.

Careful examination of the teeth revealed the following facts:

1. Severe abrasions, but with very few pulp exposures.
2. Caries very rare. (Only 5 teeth were found carious.)
3. No caries in the deciduous teeth.
4. Large and deep pits on the buccal surfaces of the molars.
5. Presence of the fifth cusp on some second molars.
6. Enamel hypoplasia was rare.
7. Considerable amount of pulp nodules. (As revealed by radiographs of 250 jaws.)
8. Third molars absent more frequently than in the white race.
9. No impacted teeth (revealed by radiographs).
10. Some periapical infections, but this was due to the extensive abrasions.
11. Some pathologic conditions were found, but only in elderly individuals and confined to only one or a few teeth as a result of local traumatic influence.

East Greenlanders.—The entire population, consisting of about 170 Eskimos, lives between the Angmagssalik and Scoresbysund Districts. This part of Greenland is closed to foreign shipping, and it is necessary to obtain permission from the government to be admitted to the region. Because of the heavy ice drifts, navigation is possible only from July to September. Only for the past twenty years has any real trade been developed with the natives.

Practically the entire native population is of a pure Eskimo race. In the remote settlements of Angmagssalik the natives still live as their forefathers did. Those living at or near the trading settlements have modified their

diet in favor of sugar and cereals. At Scoresbysund the entire population lives at or relatively near the trading station.

The results of clinical and radiographic examinations of 160 natives with a total of 17,917 teeth present, were as follows:

TABLE I

PERCENTAGES OF ESKIMOS (ALL AGES) AFFLICTED WITH CARIES OF PERMANENT TEETH

	MALE	FEMALE
Angmagssalik settlements	4.3	4.6
Trading station	43.2	51.1
Scoresbysund	23.5	42.6
Total for East Greenland	11.3	15.4

TABLE II

PERCENTAGES OF PERMANENT TEETH HAVING CARIES

	MALE	FEMALE
Angmagssalik settlements	0.3	0.6
Trading station	5.6	9.0
Scoresbysund	2.6	5.1
Total for East Greenland	1.2	2.2

TABLE III

PERCENTAGES OF CHILDREN HAVING CARIES IN DECIDUOUS TEETH

	MALE	FEMALE
Angmagssalik settlements	0.7	0.8
Trading station	42.1	47.6
Scoresbysund	29.6	15.4
Total for East Greenland	9.1	8.6

TABLE IV

PERCENTAGES OF DECIDUOUS TEETH AFFECTED

	MALE	FEMALE
Angmagssalik settlements	0.7	0.2
Trading station	14.6	15.9
Scoresbysund	29.6	8.6
Total for East Greenland	3.5	2.6

West Greenlanders.—West Greenland was first colonized by the Danish government more than two centuries ago. The native population is about 16,000. In this area the natives are of a mixed race and live under all degrees of modern civilization. Climatic conditions and accessibility being more favorable, foreign influence has played a much larger part than in East Greenland. The main occupation of the natives now is fishing, and their earnings are spent mainly on imported food, clothing, etc. Clinical and radiographic examinations of 1,634 natives, with 43,749 teeth present, revealed the following:

TABLE V

PERCENTAGES OF WEST GREENLANDERS (ALL AGES) SHOWING CARIES OF THE PERMANENT TEETH

	MALE	FEMALE
Settlements	31.8	44.4
Outposts (small trading posts)	61.2	72.7
Julianehaab (large trade center)	83.3	90.5
Total for West Greenland	57.4	67.9

TABLE VI

PERCENTAGES OF PERMANENT TEETH AFFECTED

	MALE	FEMALE
Settlements	3.4	6.2
Outposts	9.9	15.0
Julianehaab	22.1	33.8
Total for West Greenland	10.6	16.5

TABLE VII

PERCENTAGES OF CHILDREN SHOWING CARIES IN DECIDUOUS TEETH

	MALE	FEMALE
Settlements	28.8	46.2
Outposts	58.8	77.4
Julianehaab	91.1	89.8
Total for West Greenland	55.2	69.1

TABLE VIII

PERCENTAGES OF CARIES IN DECIDUOUS TEETH

	MALE	FEMALE
Settlements	9.6	11.7
Outposts	24.6	27.9
Julianehaab	46.8	53.1
Total for West Greenland	23.1	27.1

As this is but a preliminary report of the investigation started since 1935, further reports should give more facts concerning the pathologic conditions of the adjacent tooth structure, especially of the West Greenlanders. Sufficient data, however, are given in this preliminary report to verify further the appalling effects of modern civilized diet on the teeth.

S. Trieff.

Editorials

Cooperation or Regimentation—Which?

GENERATIONS ago people thought the world was flat. They believed this because their elders and more experienced forefathers had told them it was true; furthermore, all their contemporaries said so. Now everything is changing at a rapid pace; and some people will change with the times and find life exciting to the end, while others will live in puzzled confusion, still believing in old untruths because some one told them so.

It appears that sooner or later we shall see medicine and dentistry become public services as are now the army and the navy; therefore we must change perspective. Why not another change and have the government establish medical and dental schools similar to West Point and Annapolis, to train men in health service as it does officers in the army and the navy. The government could supply tuition, books, supplies, food and clothing, and a monthly salary, much as for cadets while they are in training. With this in effect, the government could take over all schools and hospitals and nurses' training schools; and, when the students are graduated, they could be assigned to their stations to practice. Medical care could be furnished free to everybody at government hospitals and clinics by the medical corps of the United States. The members of the healing professions could be paid by the government according to rank and length of service, given one month's vacation a year, and retired on full pay at a fixed retirement age.

Fantastic as this picture may seem, many would welcome the economic security under such a plan; some would indeed welcome the government subsidy to offset the high cost of medical and dental education, which even now presents an economic problem difficult of solution.

In fact, the high cost of dental and medical education is now a favorite topic of discussion. Requirements for entrance to a first-rate school are: a high school education or its equivalent and two or more years in a college of repute. Then the student spends four years in a school of top rating, followed by a probation period of three or more years before he is ready to practice and make a living. When the graduate starts private practice there are large expenses to be taken into account: office rent, telephone, electricity, automobile, equipment, journals, postgraduate study, etc. Let us assume that he decides to specialize in a particular branch of medicine or dentistry; this entails still further preparation, expense, and careful qualification. This, then, does not reconcile itself with the present trends of practice set-ups.

There are now both in operation and in process of incubation literally myriads of plans, schemes, and ideas formulated to supply medical care to all the people. Many of these plans are sponsored by laymen, and are promoted solely to create jobs. Witness the health service co-ops of various kinds appearing like mushrooms all over the country.

The co-op plan, which is now coming rapidly to the fore in some localities, works somewhat as follows: The association maintains a staff of specialists assisted by a number of consultants. To obtain services, individual members if they join in a group pay $1 a month. A man and his wife may join for $2 a month, and a family with any number of children for $3. On joining, members are given a thorough medical examination, during which they are routed around to each of the appropriate specialists, and a complete medical history is taken. At least once a year thereafter they must have a similar checking over. After the organization has them finger-printed, so to speak, they are then ready to be maintained in good health.

After all is said and done, all the unrest about medical care and the criticism being made of the present medical set-up, or the private fee and practice system, are but phases of many other economic problems of the day. In attempting to solve this problem, there is sure to arrive some kind of "shirt-ism" in the medical and dental professions. Viewing the whole problem from the present status of its development and the rapidly shifting times, it would appear that organized groups representing all branches of practice will sooner or later replace the individual practitioner if patients are to receive thorough examination and treatment and if the prevention of disease is to become the outstanding feature of all practice.

Dental practice necessarily will follow the lead of medicine, and the various specialties will no doubt fit into the whole picture according to the demands which are made upon them to complete an important link in the physical well-being of the people. The time has arrived for cooperation on the part of all professional groups, because regardless of the merit of the present system of practice a great change is inevitable. Cooperation will contribute to the satisfactory rounding out of the ultimate plan adopted, and opposition on the part of organized groups can end only in "goose-step" regimentation and in practice by statute.

H. C. P.

So It Goes . . .! !

The well-known Dr. Haggard asserted that "The most persistent error in the field of medicine is *complacency*—the tendency to accept the prevailing belief."* He properly shows that the false basic concepts that have dominated medicine have their origin in the medieval belief in the supernatural cause of disease, a fallacy which apparently many individuals have proved incapable of discarding to this very day. Likewise every modern physician must agree with Langdon-Brown† that conclusive clinical evidence is difficult of attainment, partly owing to the tendency to accept evidence pleasing to our prejudices. That this is often true is evidenced by the reported attacks against any new idea, no matter how logical and substantiated it may be, if the underlying theory does not happen to coincide with the preconceived notions of the opponent.

*Haggard, Howard W.: Error in Medicine, in "The Story of Human Error" edited by Joseph Jastrow, New York, 1936, D. Appleton-Century Co.

†Langdon-Brown, Walter: The Dead Hand in Medicine Science, Lancet 1: 279, 1938.

One of the most interesting side lights of being editor of a journal many of the pages of which are devoted to the advancement of the science and practice of orthodontics, is to note the wide variation in opinion that exists among even the most outstanding workers in the field, pertaining to the commonplace, every-day problems of treatment and methods.

One man, for instance, writes that he believes no operator should band all the anterior teeth in a child's mouth for the purpose of correcting malocclusion, his contention being that this technique belongs entirely to a past orthodontic era and has no proper place in present-day orthodontics. Another writer, on the other hand, vehemently contends that orthodontic courses should be established wherein men may be able to spend some time developing the modern technique that requires the banding of all the anterior teeth in order to establish a more stabilized, efficient, and scientific method of correcting malocclusion. One man writes that the various cephalic diagnoses have very little to do with the modern orthodontist's problem, while another states that if orthodontists would take more kindly to craniocephalic diagnosis, progress in the orthodontic field would be more rapid.

Orthodontics cannot be charged with suffering from medicine's most persistent error, complacency, but enjoys a good, healthy, vigorous difference of opinion on many important issues. That is as it should be, for it is the contribution of ideas from many sources that gives impetus to progress and advancement. Nevertheless, in present-day orthodontics, opinions in not a few instances are from diametrically opposite poles. One wonders where the border line is between science and hobby-riding, inasmuch as this line of demarcation evidently is not sharply defined. Perhaps all orthodontists, like physicians, must assume the theme of Langdon-Brown, i.e., that conclusive clinical evidence is difficult to obtain unless it pleases our prejudice.

H. C. P.

In Memoriam

William Henry Gilpatric

IT WAS a great shock to orthodontists throughout the nation to learn of the death of two well-known orthodontists in Boston within the short space of a few weeks.

Dr. William Henry Gilpatric died Tuesday evening, March 29, at his home in Boston, following an illness of more than six months. Dr. Gilpatric was the son of William and Virginia Gilpatric. He was born in Plymouth, N. H., December 15, 1881, and completed his preliminary education at New Hampton College in that city. He was graduated from the Harvard Dental School in 1905. That same year he became associated in the practice of dentistry with Dr. A. V. Rogers in Winchester, Mass. He gave up his practice in Winchester to spend several years in New York studying orthodontics with Dr. Victor H. Jackson of that city. Returning to Boston then in 1912, Dr. Gilpatric opened offices at 139 Newbury Street, where he remained until 1920. He was widely known in his profession; he was a former president of the Massachusetts Dental Society, a former president of the Harvard Dental Alumni Association, and the immediate past president of the Harvard Odontological Society. He was a member of the American Academy of Dental Science, the New York Society of Orthodontists, the American Dental Association, New England Dental Society, and Delta Sigma Delta fraternity. He was a member of the board of admission of the Harvard Club of Boston, held membership in the Winchester Country Club, and William Parkman Lodge of Masons, was a former member of the Calumet Club and a member of the First Congregational Church.

On October 18, 1909, Dr. Gilpatric married Carolyn Draper Nutt, who survives him, with a son, William Henry Gilpatric, Jr., a student at the Harvard Dental School at this time.

Orthodontists will remember Dr. Gilpatric well for his marked energy and enthusiasm for his profession and his work. He was a constant seeker of new methods, new things, and new ideas. Never was he so happy as when in the throes of creating a new "brain-child"—some new gadget.

Orthodontists everywhere will miss his genial smile and friendly hand.

Frank A. Delabarre

Orthodontists everywhere were shocked to learn of the death of Dr. Frank A. Delabarre, at Faulkner Hospital, Jamaica Plains, Massachusetts, on April 15.

Dr. Delabarre was born April 8, 1867, at Conway, Mass., the son of Edward and Maria Delabarre. He was educated at Mowry and Goff English and Classical High School, Providence, R. I.; at Amherst High School, Amherst, Mass.;

and at Amherst College, class of 1890. Dr. Delabarre then took up the study of dentistry at Boston Dental College, later attending the University of Pennsylvania Dental Department (class of 1894), and was granted the degree of M.D. by the Medical Department of that same institution in 1895.

Dr. Delabarre practiced dentistry in the city of Boston, starting there in 1895, and continued to be active in his practice until the time of his death. His was a very interesting and energetic life; he was assistant professor of orthodontics at Tufts College Dental School (1907-1918); chief of orthodontic staff at Forsyth Dental Infirmary for Children; dean of the Post-Graduate School of Orthodontia, Forsyth Dental Infirmary, 1914-19; member of Dental Advisory Committee, Massachusetts Department of Public Health; president of the American Academy of Dental Science, 1911; president of the New York Society of Orthodontists, 1927; president of the Massachusetts Dental Society, 1931; president-elect of the American Society for the Promotion of Dentistry for Children (resigned); fellow of the American College of Dentists; lecturer, Post-Graduate School of Orthodontia, Harvard University Dental School; lecturer and clinician, Forsyth Dental Infirmary for Children; past Supreme Grand Master, Delta Sigma Delta Fraternity; a member of Alpha Delta Phi fraternity, and of the European Orthodontological Society.

At the time of Dr. Delabarre's death, he was president-elect of the newly formed American Association of Orthodontists. He not only was devotedly interested in the science and practice of orthodontics, but was one of the leaders in the promotion of dentistry for children, and was active in all organizations interested in the advancement of the subject. In fact, at the time of his death, he had a well-formulated plan to hold a joint meeting of the American Association of Orthodontists and the American Society for the Promotion of Dentistry for Children, to be held in Boston during his administration as president of the American Association of Orthodontists.

Dentistry has lost, in his passing, another of its leaders and one of its sincere and energetic workers, one who was highly respected by all who knew him. His was indeed a creative, ambitious and well-rounded life, and his loss will be keenly felt by orthodontists with whom he spent much of his time.

Frederick C. Kemple

1871-1938

One of the pioneers and original orthodontists of New York City, a man highly regarded in his chosen profession, is gone! Dr. Frederick C. Kemple died on May 21, and orthodontics has lost another man who stood by the cradle when this infant health service was born.

Dr. Kemple was graduated from the University of Pennsylvania; he engaged in general practice in his home city of Erie, Pennsylvania. Later, however, he took up the study of orthodontics while the specialty was still in its infancy and studied under the late Dr. Angle in St. Louis, Mo., in 1906. He then located in New York City, where he had practiced since that time.

Dentistry had background and tradition with Dr. Kemple. His father was a dentist before him, and he became interested in the subject during his high school days while working in his father's laboratory. He belonged to the original group led by the late Dr. Edward H. Angle who founded the American Society of Orthodontists at the turn of the century. He was chairman of the Committee on Constitution and By-Laws for the original organization, and it is said he had much to do with the drafting of the original Constitution and By-Laws. When the American Society of Orthodontia went through some of its hectic years about 1906-1907, when there were dissension and misunderstanding, when the Society was in danger of disruption, Dr. Kemple was one of those who steadfastly stood by and held the organization intact.

Frederick Kemple was born in Ohio, January 31, 1871. A most appropriate tribute has been written by his friend, Dr. Arthur H. Merritt, of New York City; accordingly no greater insight can be had of the character and career of this pioneer orthodontist than to quote from the obituary prepared by Dr. Merritt.*

"His love for children was unbounded. His little patients came to him as strangers but after that first visit, they were devoted friends. How many times have I seen him with his arms around them, his face radiant with happiness, as he bade them good by at his office door. He was not their dentist, he was their friend and they repaid his affection with a loyalty and devotion such as is given but few to enjoy. In very truth it can be said of him, he loved little children.

"Because of failing health he retired from active practice in 1928, but after a brief period of retirement he again took up the work which he loved and to which he had given so much of his life. He was never able, however, to carry on for more than a few hours a day. The spirit was willing, but the flesh was weak. In these latter years, I was closely associated with him. I saw him almost daily. Though he knew the serious nature of his illness and at times suffered much, he was always cheerful, always brave, never once did he complain. He loved life and his friends; he loved the beautiful in art, literature and music. All his life he was a student of Shakespeare and Bobbie Burns, and to hear him recite Hamlet's soliloquy or Tam O'Shanter was a benediction. He did it with consummate skill, his mind was like some finely tuned instrument that needed only to be touched to give back noble and responsive melody. He had made it a store-house of beauty.

"Though of strong convictions and able and willing at all times to defend them, he did so without bitterness or ill will; his was a nature that knew no malice. The Golden Rule was his code of ethics; and he knew no other. He made it a lamp to his feet and a light to his path. In every relationship of life, he was generous, kindly and sympathetic. What more could one ask?"

The specialty of orthodontics was organized, nurtured, and tutored by a group of outstanding individuals. Their work started about the beginning of the century. Frederick C. Kemple was one of them. His memory will be held in highest regard by a host of friends and confreres.

*New York Journal of Dentistry.

Clyde W. Scogin

Major Clyde W. Scogin, forty-seven years old, of Denver, Colo., retired, former head of the dental department of Fitzsimmons General Hospital and nationally known for his research and active work in dental oral surgery, died at Fitzsimmons Hospital April 26.

He was born in Bloomington, Ill., but his family soon came to Denver, which he always considered his home.

Major Scogin, a 1916 graduate of the Denver University Dental College, enlisted in the army in 1917, serving with the 89th Division in France and with the Army of Occupation at Coblentz, Germany. He returned to service at Fitzsimmons Hospital in 1919.

Major Clyde W. Scogin

In 1924 he was transferred to Walter Reed General Hospital at Washington, D. C. While there he was associate professor of facial and oral surgery at George Washington University. In 1928 he was an honorary student at the Army Medical School.

He served in China from 1929 until 1932, at which time he was again transferred to Fitzsimmons Hospital to take charge of the dental department. Failing health forced his retirement in 1933.

Always a student, he was the author of many articles on facial and oral surgery and the originator of other ideas in current use. He was a member of the American Dental Association.

His death removes from dentistry one of its leading workers in surgery, as well as one who was loved and admired by all who knew him.

News and Notes

American Dental Association

The eightieth annual session of the American Dental Association will be held in St. Louis, Mo., October 24-28.

American Dental Assistants Association

The fourteenth annual session of the American Dental Assistants Association will be held at St. Louis, October 24-28, with headquarters at the DeSoto Hotel. For further informations, address

LUCILE S. HODGE, Secretary,
401 Medical Arts Bldg.,
Knoxville, Tenn.

American Dental Hygienists' Association

The American Dental Hygienists' Association will meet October 24-28 at St. Louis.

DAISY M. BELL, Secretary,
974 Amherst Street,
Buffalo, N. Y.

Washington-Baltimore Society of Orthodontists

The spring meeting of the Washington-Baltimore Society of Orthodontists was held April 21 at the Belvedere Hotel, Baltimore, Md.

The following program was presented: "A Consideration of the Bite Plane and Its Development" by Harry E. Kelsey; Case Report on "Internal Resorption" by Meyer Eggnatz; "Impactions and Pseudo-Impactions" by B. Edwin Erikson; "Open-Bite" by Earl W. Swinehart; Case Report on "Orthodontic Treatment of a Fractured Mandible Complicated by Osteomyelitis" by Kyrle W. Preis; "Mesioclusion of the Maxillary Teeth, Diagnosis and Treatment" by George M. Anderson.

Pacific Coast Society of Orthodontists

Southern Section

The regular meeting of the Southern Section was held March 11 at the University Club, Los Angeles.

Dr. Spencer Atkinson gave a talk on "The Universal Bracket and Attachments," supplementing his talk with many slides clearly showing the cortical and cancellous bone areas of the maxillae and mandible.